2.4 Marinas and Recreational Boating

Marinas and Recreational Boating Category Links:

Assessment, Siting, and Design

➔ Marina Flushing
➔ Habitat Assessment
➔ Water Quality Assessment
➔ Shoreline Stabilization
➔ Storm Water Runoff
➔ Fueling Station Design
➔ Sewage Facilities
➔ Waste Management Facilities

Operation and Maintenance

➔ Solid Waste Control
➔ Fish Waste Control
➔ Liquid Material Control
➔ Petroleum Control
➔ Boat Cleaning and Maintenance
➔ Maintenance of Sewage Facilities
➔ Boat Operation

Education/Outreach

➔ Public Education/Outreach

2.4.1 Introduction

The California *Management Measures for Polluted Runoff* defines 16 management measures to control pollution from marinas and recreational boating. Because marinas are located at the water's edge, pollutants generated by marinas and boats are less likely to be buffered or filtered by natural processes. When boating and related activities (e.g., marinas and boat maintenance areas) are poorly planned or managed, they may threaten the health of aquatic systems and pose other environmental hazards. USEPA (1993) identifies several sources of pollution associated with marinas and boating activities:

- Poorly flushed waterways
- Pollutants discharged from boats (recreational boats, commercial boats, and "live-aboards")
- Pollutants carried in storm water runoff
- Physical alteration of wetlands and of shellfish and other benthic communities during construction of marinas, ramps, and related facilities
- Pollutants generated from boat maintenance activities on land and in the water

California's management measures are intended to be applied to control impacts on water quality and habitat from marina siting and construction (new and expanding marinas), and marina and boat operation and maintenance. The measures are designed to reduce nonpoint source (NPS) pollution by requiring the best possible siting for marinas and maintenance areas, providing for the best available design and construction practices and appropriate operation and maintenance practices, and encouraging the development and use of effective pollution control and education efforts. The management measures cover the following operations and facilities (USEPA, 1993):

- Any facility that contains 10 or more slips, piers where 10 or more boats may tie up, or any facility where a boat for hire is docked
- Any residential or planned community marina with 10 or more slips
- Any mooring field where 10 or more boats are moored
- Public or commercial boat ramps
- Boat maintenance or repair yards that are adjacent to the water, and any federal, State, or local facility that involves recreational boat maintenance or repair on or adjacent to the water

The eight assessment, siting, and design management measures for marinas and recreational boating are as follows:

- 4.1A. Assessment, Siting, and Design—Marina Flushing, which provides for maximum flushing and circulation of surface waters through marina siting and designs. These practices can reduce the potential for water stagnation, maintain biological productivity, and reduce the potential for toxic accumulation in bottom sediment.

- 4.1B. Assessment, Siting, and Design—Habitat Assessment, which involves siting and designing marinas to protect against adverse impacts on fish and shellfish, aquatic vegetation, and important local-, State-, or federal-designated habitat areas.

- 4.1C. Assessment, Siting, and Design—Water Quality Assessment, which considers impacts on water quality in siting and designing new and expanding marinas

- 4.1D. Assessment, Siting, and Design—Shoreline Stabilization, where shoreline erosion is a pollution problem.

- 4.1E. Assessment, Siting, and Design—Storm Water Runoff, which involves implementing runoff control strategies to remove at least 80 percent of suspended solids from storm water runoff coming from boat maintenance areas (some boat yards may conform to this provision through NPDES permits).

- 4.1F. Assessment, Siting, and Design—Fueling Station Design, which requires that fueling stations be located and designed to contain accidental fuel spills in a limited area, and that fuel containment equipment and spill contingency plans be provided to ensure quick spill response.

- 4.1G. Assessment, Siting, and Design—Sewage Facilities, which requires that pumpout, pump station, and restroom facilities be installed at new and expanding marinas where needed to prevent sewage discharges directly to State waters.

- 4.1H. Assessment, Siting, and Design—Waste Management Facilities, which requires that facilities be installed at new and expanding marinas where needed for the proper recycling or disposal of solid wastes (e.g., oil filters, lead acid batteries, used absorbent pads, spent zinc anodes, and fish waste as applicable) and liquid materials (e.g., fuel, oil, solvents, antifreeze, and paints).

The seven operation and maintenance management measures for marinas and recreational boating are as follows:

- 4.2A. Operation and Maintenance—Solid Waste Control, which involves properly disposing of solid wastes produced by the operation, cleaning, maintenance, and repair of boats to limit entry of these wastes to surface waters.

- 4.2B. Operation and Maintenance—Fish Waste Control, which promotes sound fish waste management, where fish waste is a NPS problem, through a combination of fish cleaning restrictions, education, and proper disposal.

- 4.2C. Operation and Maintenance—Liquid Material Control requires provision and maintenance of the appropriate storage, transfer, containment, and disposal facilities for liquid materials commonly used in boat maintenance, as well as encouraging the recycling of these materials.

- 4.2D. Operation and Maintenance—Petroleum Control is aimed at reducing the amount of fuel and oil that leaks from fuel tanks and tank air vents during the refueling and operation of boats.

- 4.2E. Operation and Maintenance—Boat Cleaning and Maintenance, which requires minimization of the use of potentially harmful hull cleaners and bottom paints and prohibiting discharges of these substances to State waters.

- 4.2F. Operation and Maintenance—Maintenance of Sewage Facilities, which involves maintaining pumpout facilities in operational condition and encouraging their use so as to prevent and control untreated sewage discharges to surface waters.

- 4.2G. Operation and Maintenance—Boat Operation, which involves prevention of turbidity and physical destruction of shallow-water habitat resulting from boat wakes and propwash.

The education/outreach management measure for marinas and recreational boating, 4.3A Education/Outreach—Public Education, requires that public education, outreach, and training programs be instituted to prevent and control improper disposal of pollutants into State waters.

2.4.1.1 Background

The following fact sheets provide information on management measures that can be used to reduce NPS pollution from marinas and recreational boating activities. The guidance is intended to provide technical assistance to state program managers and others on the best practicable means of reducing NPS pollution of surface waters from marinas and recreational boating.

The guidance can assist marina managers in identifying possible sources of NPS pollution and it offers potential solutions. Finding a solution to NPS pollution problems at a marina requires taking into account the site-specific factors that together compose the setting of a marina. The management practices presented in the following fact sheets are recommended based on their successful application at many marinas. Their applicability to any particular marina or situation, however, must be determined based on site-specific factors. The applicability of the individual management practices and combinations of management practices should be considered within the overall context of the location, environment, design, and needs of the marina. Marina managers should make informed decisions, based on the circumstances at their particular marina, as to whether the management practices in this guidance or others would be most effective for controlling NPS pollution.

2.4.2 General Marina-Related Programs and Information Sources

- **Boating Clean and Green Campaign** (http://www.coastal.ca.gov/ccbn/ccbndx.html): This program provides education and outreach to promote environmentally sound boating practices for marine businesses and boaters in California. The Web site includes tips on clean boating, information on California water quality programs, listings of oil and sewage disposal sites, and links to other boating sites.

- **California Coastal Commission, Boating Clean and Green Campaign, *The California Clean Marina Toolkit*** (http://www.coastal.ca.gov/ccbn/toolkit/marina-toolkit.pdf): This Toolkit is designed to help marina operators manage and operate their facility as a "clean marina." The Toolkit includes several components designed to assist marina operators in identifying clean marina practices and resources that will help them to implement those practices. The Toolkit has four sections: The first section, *The California Clean Marina Guidebook*, provides recommended practices for addressing particular pollution problems. The second section, *Educating Boaters at*

Your Marina, is designed to assist marina operators in educating their customers to be partners in the clean marina effort. The third section, *Environmental Strategies: Case Studies*, examines a series of diverse marinas in California and what they have done to operate as clean marinas. The last section, *Information and Resources*, identifies sources for additional information on topics addressed in the Guidebook.

- **California Coastal Commission, Boating Clean and Green Campaign, *The Boat Maintenance Checklist*** (http://www.coastal.ca.gov/ccbn/checklist.pdf): This Checklist assists persons conducting boat maintenance and repair or contractors in implementing management practices for minimizing the generation of hazardous wastes, discharges of pollutants to inland and coastal waters, and air pollution discharges. The checklist also addresses management practices that include methods for the proper disposal or recycling of hazardous and solid wastes.

- **California Clean Boating Network** (http://www.coastal.ca.gov/ccbn/ccbnhomenew.html): The California Clean Boating Network is collaboration of government, environmental, business, boating, and academic organizations working toward clean boating education in California. The Web site contains information on the organization's publication, *Changing Tides*, and a variety of projects geared toward public education and the promotion of green boating practices.

- **California Department of Boating and Waterways** (DBW) (http://dbw.ca.gov/): DBW provides information to boaters on boating safety, boating law, boating guides, boating-related pollution and pollution prevention, marine sanitation device (MSD) laws, and many other topics of interest to the boating public.

- **Marine Environmental Education Foundation, *Bibliography of National Clean Boating and Clean Marina Websites*** (http://www.meef.org/bibliography/index.html): This Web site provides links to manuals, pamphlets, action plans, educational materials, and other types of resources pertaining to clean boating and marinas from all over the Web, acting as a clearinghouse for management practices and policies to reduce pollutants from marinas and recreational boating activities.

- **U.S. Coast Guard Sea Partners** (http://www.uscg.mil/hq/g-m/nmc/seapart.htm): This site has information on marine environmental protection laws, links related to marine debris, small spills, clean boating practices, and educational resources.

- **USEPA, Office of Wetlands, Oceans, and Watersheds, Nonpoint Source Branch** (http://www.epa.gov/owow/nps/marinas.html): These are federal documents on clean boating, clean marinas, and engine maintenance.

- **University of California Cooperative Extension, *Marina Pollution Prevention Manual*** (http://seagrant.ucdavis.edu/MarinaManual.pdf): This manual describes important components of pollution prevention at recreational boating facilities. It covers pollution sources, hazardous waste management, spill response, marina staff procedures and training, San Diego County agency and service contacts, and publications for distribution among marina staff, contractors, and boaters.

- **Florida Department of Environmental Protection, *Best Management Practices for Boatyards: Clean Boatyards Manual*** (http://www.dep.state.fl.us/law/Grants/CMP/bestmgmtpract.htm): This manual includes sections dealing with boat cleaning, boatyard storm water management, fire safety, hazardous waste management, hurricane information, hurricane preparation, liquid waste storage management, petroleum, planning for emergencies, sewage pumpouts and waste dump receptacles, and solid waste management.

- **San Francisco Bay Conservation and Development Commission** (http://www.bcdc.ca.gov/): This site provides information related to the health of San Francisco Bay, including on marinas, permitting for dredge and fill activities, oil spill response, and protection of local wetlands.
- **Contra Costa County Clean Water Program, California Coastal Commission, and California Department of Boating and Waterways, "Keep the Delta Clean. You Play in It. You Drink it Too!" Program** (http://www.coastal.ca.gov/ccbn/keep_the_delta_clean.html): The Program distributes educational materials and helps marinas develop pollution prevention policies and infrastructure to preserve and protect drinking water quality, recreational activities, and environmental health in the Delta. The Program focuses on the cumulative impacts of pathogens (overboard sewage discharge such as black water and pet waste), petroleum hydrocarbons (containing fuel, oil, contaminated bilge water, and solvents), and other liquid wastes (such as from engine and hull maintenance and general marina activities) generated during recreational boating and marina activities.
- **University of California Cooperative Extension and Sea Grant Extension Program, *Clean Boating Guide*** (http://seagrant.ucdavis.edu/guide.htm): This Web site provides basic information to help reduce marina pollution, such as guidelines for handling waste disposal and marine debris, and underwater hull cleaning.

2.4.2.1 References

USEPA. 1993. *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*. EPA 840-B-92-002. U.S. Environmental Protection Agency, Office of Water, Washington, DC. (http://www.epa.gov/owow/nps/MMGI/index.html)

Fact Sheet Links:
- ➔ Programs
- ➔ Management Practices
- ➔ Information Resources
- ➔ Case Studies
- ➔ References

2.4.3 Management Measure 4.1A Assessment, Siting, and Design Marina Flushing

Management Measure

Site and design new and expanding marinas such that tides and/or currents will aid in flushing the site or renew its water regularly.

2.4.3.1 Management Practices

New or expanding marinas should be designed such that the natural circulation of water from tidal action is not restricted. Ensure that the bottom of the marina and entrance channels are not deeper than adjacent navigable channels to help keep the bottom of the marina basin from becoming a pollutant trap, leading to low dissolved oxygen levels.

Consider alternatives to a single-entrance design in poorly flushed water bodies to enhance flushing, for example:

- An open design instead of a semi-enclosed design in a naturally protected location
- Wave attenuators instead of fixed breakwaters where they will provide sufficient protection

New marinas should be designed with as few enclosed water sections or separated basins as possible to promote circulation within the entire basin. Small side basins off the main basin may not flush nearly as well as a large single basin. Consider the value of entrance channels in promoting flushing when designing or reconfiguring a marina. Two entrances at opposite ends of a marina can promote flow-through currents.

Use mechanical aerators to improve flushing and water quality where basin and entrance channel configuration cannot provide adequate flushing. Place them in basin corners or other poorly flushed areas.

2.4.3.2 Information Resource

California Department of Boating and Waterways, *Layout, Design and Construction Handbook for Small Craft Boat Launching Facilities* (http://dbw.ca.gov/PDF/Lramps.pdf): This document describes both mandatory and recommended design criteria for boat launching facilities.

2.4.3.3 References

USEPA. 2001. *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating*. EPA 841-B-01-005. U.S. Environmental Protection Agency, Washington, DC. (http://www.epa.gov/owow/nps/mmsp/index.html)

Fact Sheet Links:
- ➔ Programs
- ➔ Management Practices
- ➔ Information Resources
- ➔ Case Studies
- ➔ References

2.4.4 Management Measure 4.1B Assessment, Siting, and Design Habitat Assessment

Management Measure

Site and design new and expanding marinas to protect against adverse effects on shellfish resources, wetlands, submerged aquatic vegetation, or other important riparian and aquatic habitat areas as designated by local, State, or federal governments.

2.4.4.1 Programs

The Marine Region, part of the California Department of Fish and Game, is responsible for protecting and managing California's marine resources. It was created to improve marine resource management through law enforcement, fisheries and habitat programs, environmental review, and water quality monitoring. The Marine Region has adopted an ecosystem approach that incorporates the values of biological communities and habitats as well as the public, while protecting the health of the marine environment. http://www.dfg.ca.gov/mrd/aboutus.html.

The California Ocean and Coastal Environmental Access Network (CalOCEAN) is a Web-based ocean resource information system for the State of California. It is designed to provide access to ocean and coastal data and information from a wide variety of sources on biological, physical, and legal information for resource managers, educators, students, and the general public. The data includes, or will include, an inventory of water quality monitoring projects, coastal habitat types and locations, marine managed areas, and wetlands and fisheries information. http://ceres.ca.gov/ocean/.

The Marine Life Inventory, by the California Coastal Commission, Department of Fish and Game, is a program for high school students and teachers to participate in ocean sampling while monitoring water quality (Telephone: 949-640-9956).

2.4.4.2 Management Practices

This management measure involves conducting habitat surveys and characterizing the marina site prior to construction. Critical and unique areas should be inventoried, such as shellfish beds and submerged aquatic vegetation. Areas that provide critical habitat functions, such as riparian areas, spawning areas, nursery areas and feeding areas should be identified so that appropriate measures can be taken to minimize their disturbance. Rapid bioassessment techniques provide a cost-effective way to inventory aquatic resources. Established bioassessment protocols use sampled invertebrate and fish communities as indicators of ecosystem health.

If possible, alternative sites should be considered that could minimize disturbance to sensitive areas. For example, waterfront areas that are already developed could be used for new marinas, or existing marinas could be expanded. If this is not a viable alternative, consider dry stack storage, in which boats are stored on vertical stands, minimizing disturbance, leakage, and pollution from maintenance operations. In addition, a good way to compensate for potential habitat loss is to create or expand habitats within the marina. Rough surfaces such as docks, piers, piles, and floats provide a good substrate for attachment of bivalves and other aquatic organisms.

2.4.4.3 Information Resources

USEPA, *Estuaries and Near Coastal Areas Bioassessment and Biocriteria Guidance*
(http://www.epa.gov/ost/biocriteria/States/estuaries/estuaries1.html): This technical guidance document describes protocols for conducting bioassessments in estuarine and coastal marine waters. Case studies illustrate the bioassessment process and biocriteria derivation procedures. The document discusses sampling methods and candidate metrics for benthic macroinvertebrates, fish, aquatic macrophytes, and phytoplankton.

2.4.4.4 References

USEPA. 2001. *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating*. EPA 841-B-01-005. U.S. Environmental Protection Agency, Washington, DC. (http://www.epa.gov/owow/nps/mmsp/index.html)

Fact Sheet Links:
- Programs
- Management Practices
- Information Resources
- Case Studies
- References

2.4.5 Management Measure 4.1C Assessment, Siting, and Design Water Quality Assessment

Management Measure

1. Assess water quality as a part of the siting and design of new and expanding marinas to establish baseline water quality conditions or trends.

2. Assess water quality at existing marinas to establish baseline water quality conditions.

2.4.5.1 Programs

The San Diego BayKeeper Citizen Monitoring Program trains the public to monitor local waters. BayKeeper works with regulatory agencies, municipalities, academic institutions, businesses and volunteer groups (http://www.sdbaykeeper.org/content/programs/waterMon/projects.cfm).

The Orange County CoastKeeper Citizen Water Monitoring Program organizes local citizens for volunteer monitoring of county streams and rivers (Telephone: 949-723-5424; Web site: (http://www.coastkeeper.org/coastkeeper/work/projects/water-monitoring.asp).

The Marine Life Inventory, by the California Coastal Commission, is a program for high school students and teachers to participate in ocean sampling while monitoring water quality (Telephone: 949-640-9956).

The Orange County Marine Life Refuge Project is a community watch volunteer program and a water quality monitoring program to determine the effects of urban runoff. Volunteers of at least high school age are trained in data collection and interpretation (http://www.ocparks.com/tidepools/MLRproject.htm).

The Los Angeles County Ocean Water Monitoring Program provides Web-based beach and rain advisories for Los Angeles County (http://www.lapublichealth.org/beach/).

The State Water Resources Control Board (SWRCB) sponsors the Clean Water Team Citizen Monitoring Program as part of California's NPS Program http://www.swrcb.ca.gov/nps/)

The City of Santa Barbara Clean Water Program conducts storm water sampling, and ocean and creek monitoring, and supplies information on opportunities for citizen involvement (http://www.countyofsb.org/project_cleanwater/).

The Morro Bay Volunteer Monitoring Program provides citizen monitoring opportunities in Morro Bay estuary waters (http://www.mbnep.org/volunteer/).

The Monterey Bay Sanctuary Citizen Watershed Monitoring Network is a network of citizens who comprehensively monitor the health of the sanctuary (http://www.mbnms.nos.noaa.gov/monitoringnetwork/welcome.html).

The Southern California Marine Institute's Environmental Monitoring Program educates students in grades 5–12 on marine environmental issues and water quality monitoring in southern California. The

goal of the program is to educate young people about natural resources and to allow them to become directly involved in monitoring their environment (http://www-bcf.usc.edu/~scmi/Sites/genbroch.html).

The Land Conservancy of San Luis Obispo is implementing a volunteer water quality monitoring program in the county (Telephone: 805-544-9096).

The Coastal Water Quality Monitoring Inventory is a database with information on California's Coastal Water Quality Monitoring Programs. Major water quality monitoring programs along the California coast and its bays are listed, along with details such as the water quality measurements made, locations, frequency, quality assurance information, and contact information (http://www.sfei.org/camp/).

2.4.5.2 Management Practices

Water quality assessments can be conducted through a water quality monitoring program that includes pre-development, construction, and post-development phases to assess the water quality impacts of a marina. Effective assessments can also be accomplished through numerical modeling that includes pre-development and post-construction model applications.

Prior to construction, the current water quality conditions should be assessed. Acceptable water quality data may already have been collected by the U.S. Geological Survey, the U.S. Army Corps of Engineers, State and local agencies or local universities. If new data are required, there are a few ways to collect information when resources are limited:

- Visual inspections of water quality might suffice. Keeping an eye out for oil sheens, trash, and sediment buildup on aquatic plants can be a simple way to track water quality.
- Use rapid bioassessment techniques to monitor water quality. Aquatic insects and grasses can be surveyed quickly and give a good visual idea of how clean the water is.
- Establish a volunteer monitoring program. Enlist the help and environmental enthusiasm of slip renters and their kids. Its good for the marina and the volunteers learn a lot!

As an alternative to a comprehensive monitoring program, water dynamics in a marina basin can be modeled. It is important to keep in mind that all modeling applications require some field data for calibration, and a cost-effective approach would be a combination of both water quality monitoring and numerical modeling. These models can be used to investigate alternative designs and their predicted impact on water quality.

2.4.5.3 Information Resources

Water Quality Monitoring

- **USEPA, *Microbial Source Tracking Guide Document*** (http://www.ces.purdue.edu/waterquality/resources/MSTGuide.pdf): This document serves as a reference guide to those considering microbial source tracking (MST) tools for water quality evaluations and TMDL-related activities. Insight into various tools and approaches used to track sources of fecal contamination impacting water quality is provided. Also provided are descriptions of research and several case studies gathered through workshops, literature searches, and phone interviews.

- **USEPA, *Monitoring and Assessing Water Quality*** (http://www.epa.gov/owow/monitoring/): This Web site is a repository of technical guidance and information on various water quality

assessment techniques. Guidance documents on biological assessment and volunteer monitoring are included.

Watershed Planning

California Coastal Commission, *California's Critical Coastal Areas (CCA) Program*
(http://www.coastal.ca.gov/nps/cca-nps.html)*:* The CCA Program encourages collaboration among local stakeholders and government agencies to better identify coastal-zone watershed areas in critical need of protection from polluted runoff.

Bioassessment

- **USEPA, *Estuaries and Near Coastal Areas Bioassessment and Biocriteria Guidance***
(http://www.epa.gov/ost/biocriteria/States/estuaries/estuaries1.html): This technical guidance document describes protocols for conducting bioassessments in estuarine and coastal marine waters. Case studies illustrate the bioassessment process and biocriteria derivation procedures. The document discusses sampling methods and candidate metrics for benthic macroinvertebrates, fish, aquatic macrophytes, and phytoplankton.

- **California Department of Pesticide Regulation, *Procedure for Collecting Benthic Marcoinvertebrates using a Hester-Dendy Sampler***
(http://www.cdpr.ca.gov/docs/empm/pubs/sops/eqwa006.00.pdf**):** This standard operating procedure for collecting macroinvertebrates provides instructional information regarding location selection and retrieval procedures.

2.4.5.4 Case Studies

Clean Water Team. The Clean Water Team (CWT) is the citizen monitoring program of the California SWRCB. Regional CWT Citizen Monitoring Coordinators provide technical assistance, training, data management consultation, outreach, and education to citizen monitoring organizations. Citizen monitoring activities include collecting water quality data, evaluating fish habitat, counting birds, or making visual observations of water health. Monitoring activities are available for school children, youth groups, landowners, and community organizations (http://www.swrcb.ca.gov/nps/mission.html).

Newport Bay Bacteria Study. The Santa Ana Regional Board undertook a study to determine if marinas and vessel wastes are major contributors of bacteria to Newport Bay. Researchers collected water and sediment samples from two marinas, with approximately 20 sites per marina that included locations in the marina, in channels, and near storm drains. Samples were collected every 3 hours for approximately 3 days to determine temporal variations, and samples were collected in high use (summer) and low use (winter) seasons. The results showed little site-to-site variability and large seasonal variability. More than 90 percent of the water samples met AB411 standards for total coliform, E. coli, and enterococcus; greater than 10 percent enterococcus concentrations exceeded the single standard in one study. Sediment bacterial concentrations were 1 to 2 orders of magnitude higher than water quality standards and also showed high seasonal variability. The major conclusion was that surface runoff, rather than vessel waste, was the major source of bacteria to marinas and channels. The study can be accessed at the Santa Ana Regional Board Web site at http://www.waterboards.ca.gov/santaana/.

2.4.5.5 References

USEPA. 1993. *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters*. EPA 840-B-92-002. (http://www.epa.gov/owow/nps/MMGI/index.html)

USEPA. 2001. *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating*. EPA 841-B-01-005. U.S. Environmental Protection Agency, Washington, DC. (http://www.epa.gov/owow/nps/mmsp/index.html)

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2.4.6 Management Measure 4.1D Assessment, Siting, and Design Shoreline Stabilization

Management Measure

Where streambank or shoreline erosion is a NPS pollution problem, streambanks/shorelines should be stabilized (when determining whether streambank/shoreline erosion is a NPS problem, assess natural erosion rates and the dynamic equilibrium of the streambank/shoreline). The use of vegetative stabilization methods is preferred over the use of structural stabilization methods, if appropriate considering the climate, severity of erosion, offshore bathymetry, and/or the potential adverse impact on other streambanks or shorelines and offshore areas.

2.4.6.1 Programs

Through its Beach Erosion Control Program, the California Department of Boating and Waterways acts as shore protection advisor and plans, designs, and constructs erosion control structures when funds are available. The goals of the program are cosponsoring beach erosion control projects with local and federal agencies, improving present knowledge of oceanic forces, beach erosion and shoreline conditions, and preventing future erosion (http://dbw.ca.gov/beach.asp).

2.4.6.2 Management Practices

Shoreline stabilization can be accomplished using either vegetative or structural stabilization techniques. When possible, vegetative stabilization is preferable and often more aesthetically pleasing. Use vegetative plantings, wetlands, beaches, and natural shorelines where space allows.

If structural stabilization is required, riprap revetment is preferable to a solid vertical bulkhead. This is because riprap allows for colonies of aquatic animals and plants and absorbs wave energy better than bulkheads.

Shorelines can be protected from wave energy with structural features such as vertical bulkheads in areas where reflected waves will not endanger shorelines or habitats. Artificial reef structures can be used as submerged breakwaters, providing wave attenuation for shoreline erosion control. More information about using artificial reef structures for erosion control and habitat enhancement can be found at http://www.artificialreefs.org/ScientificReports/Lee%20Harris_ASR_RBBW.pdf (Harris, 2003).

At boat ramps, retain natural shoreline features to the extent feasible and protect disturbed areas from erosion.

2.4.6.3 Information Resources

- **City of Newport News, *Shoreline Erosion Control Informational Brochure*** (http://www.newport-news.va.us/plan/shoreline.pdf): This four-page brochure provides an overview of various structural and non-structural shoreline stabilization and erosion control practices, complete with photographs, a discussion of environmental impacts, and cost information.

- **U.S. Army Corps of Engineers, *Low-Cost Shore Protection: A Guide for Engineers and Contractors*** (http://chl.erdc.usace.army.mil/CHL.aspx?p=m&a=MEDIA;241): This document caters to individuals with some prior experience with civil engineering. It outlines various affordable shoreline stabilization techniques.

- **National Shoreline Erosion Control Development and Demonstration Program, *Coastal Shore Protection Structures and Techniques*** (http://chl.erdc.usace.army.mil/CHL.aspx?p=s&a=ARTICLES;199): This Web site is a compilation of user-friendly fact sheets that describe and illustrate a number of structural and nonstructural shoreline stabilization practices. The site also links to technical documents, case studies, and useful databases.

- **Black, K., *Artificial Surfing Reefs for Erosion Control and Amenity: Theory and Application*** (http://www.asrltd.co.nz/downloads/Reefs/reef%20general/reeferosion1.pdf): Offshore reefs with recreational amenities are shown to have three important "MOA" qualities (multi-purpose, offshore, and adjustable), which makes these structures more versatile and adaptable than sea walls, breakwaters, or groins. This paper addresses the logic and benefits of offshore, multi-purpose, coastal protection structures through example, theory, and application.

- **Harris, L.E., *Artificial Reef Structures for Shoreline Stabilization and Habitat Enhancement*** (http://www.asrltd.co.nz/downloads/Reefs/3rd%20Surfing%20Reef%20Conference%20Papers/Artificial%20Reef%20Structures%20for%20Shoreline%20Stabilization.pdf): This research paper provides information on submerged artificial reef structures, such as Reef Ball™, for use as a shoreline stabilization technique. A reference site along the southern shore of the Dominican Republic shows that a Reef Ball™ breakwater has been very effective in stabilizing the beach, with a significant increase in beach width and elevation along the project shoreline.

- **Watershed Institute, *Are "Stable Shoreline" and "Broad Beaches" Mutually Exclusive Management Goals Along Southern Monterey Bay?*** (http://science.csumb.edu/~ccows/pubs/reports/CCoWS_CoastalRetreat_050523.pdf): This report details some of the key coastal geomorphic concepts presented to a panel on coastal erosion. Topics discussed in this report include sea level rise and long-term coastal retreat rates, beach nourishment and jetties, and reducing the loss of sand to offshore storage.

2.4.6.4 References

Harris, L.E. 2003. Artificial reef structures for shoreline stabilization and habitat enhancement. In *Proceedings of the 3rd International Surfing Reef Symposium*, Raglan, New Zealand, June 22–25, 2003, pp. 176–179.

USEPA. 2001. *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating*. EPA 841-B-01-005. U.S. Environmental Protection Agency, Washington, DC. (http://www.epa.gov/owow/nps/mmsp/index.html)

Fact Sheet Links:

- Programs
- Management Practices
- Information Resources
- Case Study
- References

2.4.7 Management Measure 4.1E Assessment, Siting, and Design Storm Water Runoff

Management Measure

Implement effective runoff control strategies, which include the use of pollution prevention activities and the proper design of marinas and boat maintenance areas (including parking areas). Reduce the average annual loadings of total suspended solids (TSS) in runoff from these areas to meet water quality objectives.

2.4.7.1 Programs

The Marin County Storm Water Pollution Prevention Program produces publications and Web-based information about used oil, hazardous waste, recycling, storm water, and other water quality issues (http://www.mcstoppp.org/).

The LA County Department of Public Works runs a Storm Water Program that provides Web-based information on used oil, solid waste, storm water runoff, recycling, storm drain stenciling and hazardous waste (http://www.ladpw.org/epd/).

The Orange County Watersheds and Coastal Resources Division publishes information on storm water programs and prevention. The Web site for their water pollution hotline provides instructions on reporting a storm drain or water pollution problem, and on the disposal of hazardous wastes (http://www.ocwatersheds.com/WQHotline/wqh_introduction.asp).

The City of Santa Monica's Urban Runoff Program provides urban runoff tips, a contact number for reporting illegal discharges into storm drains and other urban runoff problems, and links for urban runoff-related publications (http://santa-monica.org/epd/residents/Urban_Runoff/urban.htm).

The City of Dana Point, Clean Beaches, Clean Oceans provides a public awareness program on the causes of pollution and solutions. It is expanding a catch basin filter installation and maintenance program, as well as educating owners on runoff, recycling, household waste, and grease prevention in sewers (Telephone: 949-248-3588).

The Santa Clara Valley Urban Runoff Pollution Prevention Program provides a toll-free phone number where callers can obtain information about urban runoff issues (Telephone: 1-800-794-2482; Web site: http://www.scvurppp-w2k.com/default.htm).

Kids for Clean Water in Orange County provides education on the prevention of urban runoff (Telephone: 949-497-7128).

2.4.7.2 Management Practices

Structural Practices

Increasing vegetation is an easy way to slow runoff and naturally remove pollutants from storm water. Crushed stone paving, sand filters, wet ponds, grassy swales, and traps can be used to catch solids from

runoff, and should be installed in particular between impervious areas and the marina basin. Install lawn and garden buffers along the bulkhead to act as natural filters and add beauty to the facility. Where possible, minimize paved surfaces next to the bulkhead to allow rain to soak into the ground instead of running into the water. Finally, construct or restore wetlands where feasible and practical. Wetlands are great storm water filters they provide wildlife habitat and add a natural character to the marina.

Pollutants can also be captured and filtered out of runoff water with permeable tarps, screens, and filter cloths. Install simple oil traps with absorption pillows and debris filters between the work areas and the bulkhead to protect the water quality. Absorbent pillows and filters collect what sweeping misses, like oils and solvents. Install oil/grit separators to capture petroleum spills and coarse sediment. Finally, use catch basins where storm water flows to the marina basin in large pulses (these should be designed by an engineer).

Good Housekeeping

Do as much maintenance work as possible indoors away from rain and runoff. For outdoor work, provide clearly designated land areas away from the water and insist on their use. Also, perform abrasive blasting and sanding in spray booths or tarp enclosures to prevent the wind from taking debris to the water. Restrict the type and amount of do-it-yourself work done at the marina.

Clean hull maintenance areas immediately after any maintenance to remove debris, and dispose of collected material properly. Debris left behind is exposed to storm water runoff and wind. Sweep or vacuum around hull maintenance areas, roads, parking lots, and driveways frequently. Use vacuum sanders to remove paint from hulls and to collect paint dust and chips. Vacuum sanders can collect as much as 99 percent of the dust.

Storm Drain Marking

Storm drain signs and stencils are highly visible source controls that are placed on or directly adjacent to storm drain inlets. Stencils and signs with prohibitive language and/or graphical icons are intended to alert the public to the fate of pollutants that enter the storm drain. Signs can be cast directly into the catch basin (concrete or metal), painted on using stencils, or affixed with glue (prefabricated plastic or metal signs). Volunteers can be used to apply painted or prefabricated signs when supervised by municipal staff, private business owners, or marina operators.

2.4.7.3 Information Resources

- **California Coastal Commission, Boating Clean and Green Campaign, *The California Clean Marina Toolkit*.** (http://www.coastal.ca.gov/ccbn/toolkit/marina-toolkit.pdf): The Toolkit includes a section describing some recommended practices marina operators can implement for addressing storm water and polluted runoff issues at marinas.
- **New York Sea Grant Extension Program, Cornell Cooperative Extension, *Stormwater Runoff Best Management Practices for Marinas: A Guide for Operators*** (http://www.seagrant.sunysb.edu/pages/BMPsForMarinas.htm): This 1998 bulletin describes hull maintenance practices and storm water treatment devices suitable for marinas. Cost estimates, planning and technical considerations, photographs, and drawings are included. The document is available online or can be ordered for $2.00.
- **Florida Department of Environmental Protection (DEP), Boatyard Stormwater Management** (http://www.dep.state.fl.us/law/Documents/Grants/CMP/pdf/BoatyardStormwaterManagementB

MP.pdf): This six-page fact sheet, part of the Florida DEP's *Clean Boatyard Manual*, describes management practices for controlling storm water at marinas.

- **California Stormwater Quality Association, *California Stormwater BMP Handbook: Storm Drain Signage*** (http://www.cabmphandbooks.com/Documents/Development/SD-13.pdf): In addition to providing general information regarding storm drain signage/stencils, this fact sheet outlines design considerations and overall maintenance for these signs.

- **International Council of Marine Industry Associations, *United States Environmental Protection Agency Regulations and Guidance for Controlling Storm Water Pollution Discharge from Marinas and Boatyards*** (http://www.icomia.com/library/library_search.asp?Search=marina%20flushing#): This paper address issues such as what constitutes storm water discharge and pollution from marinas and the types of sources of storm water discharge that are currently regulated under Federal and State programs.

- **USEPA, *National Menu of Best Management Practices: Storm Drain Marking*** (http://cfpub.epa.gov/npdes/stormwater/menuofbmps/invol_6.cfm): This fact sheet describes how a municipality can implement a storm drain marking program using community volunteers or city staff. These signs can raise awareness about the connection between storm drains and receiving waters and can help to deter littering, excess fertilizer use, dumping, and other practices that contribute to nonpoint source pollution.

2.4.7.4 Case Study

Ski Run Marina Stormwater Filtration System. Ski Run Marina is located directly on Lake Tahoe and directly discharged its storm water into the lake. To prevent NPS pollution from entering the lake, the marina installed a state-of-the-art storm water filtration system, The Stormwater Management StormFilter®, developed by Stormwater Management, Inc. The Ski Run Marina project used a combination of perlite and zeolite filtration media, which allows the StormFilter® to effectively remove the storm water pollutants that have an adverse impact on Lake Tahoe. (http://www.stormwaterinc.com/bmp-cs-ski.php#solution).

2.4.7.5 References

USEPA. 2001. *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating*. EPA 841-B-01-005. U.S. Environmental Protection Agency, Washington, DC. (http://www.epa.gov/owow/nps/mmsp/index.html)

Fact Sheet Links:
- Programs
- Management Practices
- Information Resources
- Case Study
- References

2.4.8 Management Measure 4.1F Assessment, Siting, and Design Fueling Station Design

Management Measure

Design existing and proposed fueling stations to allow for spill prevention and for ease in cleanup of spills that may occur.

2.4.8.1 Programs

The Marina Fueling Facilities Project is a component of the California SWRCB's Underground Storage Tank Program. The program administers guidelines and performs inspections for the design and construction of fuel storage, piping, and dispensing systems in marinas (http://www.swrcb.ca.gov/ust/leak_prevention/marina/).

The California Office of Spill Prevention and Response (OSPR) includes a Marine Safety Branch, which works to protect marine resources by developing and maintaining spill prevention measures and response plans. The OSPR requires that all marine facilities and tank vessels carrying petroleum product as cargo, as well as all nontank vessels over 300 gross tons, have California-approved oil spill contingency plans (http://www.dfg.ca.gov/ospr/organizational/msb/msb.htm).

The Pacific Oil Spill Prevention Education Team (POSPET) is a forum for information exchange among various stakeholder groups in British Columbia, Washington, Oregon, and California pertaining to oil spills. POSPET has developed a Spills Aren't Slick campaign and has also been instrumental in promoting the innovative 1-800-OILS-911 spill reporting number in the Pacific states and British Columbia. This easy-to-remember number allows a boater reporting an oil spill to be automatically routed to the correct emergency response call center in any of those jurisdictions. The Pacific States/BC Oil Spill Task Force provides staff support for POSPET and maintains the spill reporting number (http://www.oilspilltaskforce.org/pospet.htm).

2.4.8.2 Management Practices

For Boaters

Boaters should keep engines properly tuned for efficient fuel consumption and clean exhaust. Avoid overfilling gas tanks, and listen for splashbacks just in case the shutoff nozzle does not work in time. Always keep an absorbent pad ready in case of spills.

For Marina Owners and Operators

Education and Training: Train employees to give information and direction to customers before they begin fueling. Don't take it for granted that boaters know the correct fueling procedures. Install easy-to-read signs on the fuel dock that explain proper fueling, spill prevention, and spill reporting procedures, especially at self-serve facilities.

Site Design

Locate and design boat fueling stations so that spills can be contained, such as with a floating boom, and cleaned up easily. This usually means locating them away from clutter in areas where spill cleanup will not cause traffic problems.

Spill Prevention

Remove old-style fuel nozzle triggers that are used to hold the nozzle open. Install automatic shutoff systems on fuel nozzles. They help keep spills small and prevent tanks from overfilling. In addition, use a spill monitoring system that will shut off the main line when a leak is sensed.

Install personal watercraft floats at fuel docks to help drivers stabilize their boats and refuel without spilling.

Regularly inspect, maintain, and replace fuel hoses, pipes, and tanks. A small leak can mean a big spill, so check your system often.

Spill Response

Create an emergency spill response plan for containment and cleanup. Make sure to post readable directions for spill response, because in an emergency situation it is important to know exactly what to do. Have spill containment equipment storage, such as a locker attached to the fuel dock, easily accessible and clearly marked. Be prepared for over-spill and excess fuels—keep absorbent pads on hand. If there is an oil spill, call the Coast Guard (Telephone: 1-800-424-8802).

2.4.8.3 Information Resources

- **Virginia Clean Marina Guidebook, *Emergency Planning*** *(*http://www.vims.edu/adv/cleanmarina/emergencyplanning.pdf): This chapter outlines important emergency planning procedures applicable to marinas.
- **California Department of Fish and Game, Office of Spill Prevention and Response, *Oil Spill Reporting Procedures*** (http://www.dfg.ca.gov/ospr/misc/reportaspill.html): This Web site provides basic reporting and contact information.
- **California Coastal Commission, Boating Clean and Green Campaign, *The California Clean Marina Toolkit*** (http://www.coastal.ca.gov/ccbn/toolkit/marina-toolkit.pdf): The Toolkit includes a section describing suggested practices to help marinas to control oily discharges from boats, encourage proper disposal of oily waste, prevent fuel spills, and remove sunken and abandoned vessels. The Toolkit also includes a boater fact sheet including information on what boaters can do to prevent oil and fuel pollution form their boats.
- **California Coastal Commission, Boating Clean and Green Campaign, "*Fill It, Don't Spill it*" Fuel Dock Signs** (http://www.coastal.ca.gov/ccbn/Fuelsign.jpg): The signs include management practices to reduce fuel spills and provide the State and Federal phone numbers to report oil and chemical spills as well as the 1-800-CLEANUP number to locate the nearest environmental services (used oil collection, sewage and bilge pumpouts and absorbent pad distribution and collection facilities) for boaters by zip code.

2.4.8.4 Case Study

Elliot Bay Marina Fueling Station. Elliott Bay Marina in Seattle, Washington, has implemented a number of management procedures, including fueling station design and petroleum control. The marina fuel dock is equipped with double-walled tanks and fuel lines, as well as monitors, sensors, and automatic shutoff in case a leak is detected. The marina keeps oil booms, spill containment kits, and an aluminum pontoon boat on hand for spill response. Boaters are also asked to sign a slip agreement in which they promise to follow the marina's environmental rules (http://www.elliottbaymarina.net/history.htm).

2.4.8.5 References

USEPA. 2001. *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating*. EPA 841-B-01-005. U.S. Environmental Protection Agency, Washington, DC. (http://www.epa.gov/owow/nps/mmsp/index.html)

Fact Sheet Links:

- Programs
- Management Practices
- Information Resources
- Case Study
- References

2.4.9 Management Measure 4.1G Assessment, Siting, and Design Sewage Facilities

Management Measure

Install pumpout, dump station, and restroom facilities where needed at new and expanding and existing marinas to reduce the release of sewage to surface waters. Design these facilities to allow ease of access and post signage to promote use by the boating public.

2.4.9.1 Programs

The Clean Vessel Act of 1992 Pumpout Grant Program, established by Congress, is administered by the California Department of Boating and Waterways. The Clean Vessel Act grant funds are available the public and private sector. Grant recipients receive reimbursement for up to 75 percent of the cost of installing or renovating equipment for sewage pumpout facilities (http://dbw.ca.gov/pumpout.asp).

The California Department of Boating and Waterways provides educational resources and guidance on vessel pumpout facilities, California law governing the discharge of sewage, and management practices (http://www.dbw.ca.gov/Publications.asp).

California SWRCB has finalized the ***General Order Requiring Owners and Operators of Specified Vessel Terminals Located in Newport Bay and Huntington Harbour to Install, Maintain and Operate Pumpout Facilities and Dump Stations Where Necessary to Protect Water Quality*** (Water Quality Order No. 2004-0017-DWQ). USEPA has designated Newport Bay and Huntington Harbour "No Discharge Zones" in 1976. SWRCB has found that it is apparent that adequate housekeeping of pumpout facilities and education of facility users are major issues that need to be addressed in Newport Bay and Huntington Harbour. In addition, Santa Ana Regional Water Quality Control Board (RWQCB) staff believe that there is a need for additional pumpout facilities and for the installation and proper operation of dump stations. This order requires vessel owners to comply with this order in a timeline established by the SWRCB (http://www.swrcb.ca.gov/resdec/wqorders/2004/wqo/wqo2004-0017.pdf).

2.4.9.2 Management Practices

For Marina Owners and Operators

Restroom Facilities: Marina owners or operators should ensure that there are clean, conveniently located restroom facilities available for those who use the marina, and should encourage their use by customers before casting off.

Onshore Sewage Collection Systems: Onshore sewage collections systems should be installed for slip renters and visiting boats, and a clearly marked sign should indicate their presence to all visitors. Pumpout services should be provided at convenient times and for a reasonable cost, and stations should be kept clean. Collection systems include the following:

- Fixed-Point Systems: Pumpout facilities located at one or more central locations
- Dump Stations for Portable Toilets
- Portable/Mobile Systems: Pumpout facilities that can be moved to the location where a boat is docked

No Discharge Zones: Consider declaring the marina a No Discharge Zone if it is not already in a federal or State-designated No Discharge Zone. The following site provides a list of federal No Discharge Zones: http://www.epa.gov/owow/oceans/regulatory/vessel_sewage/vsdnozone.html.

For Boaters

Boaters should always use onshore restrooms when their boats are docked, particularly if the boat does not have a toilet. If planning a boat trip for three or more hours, plan for onshore restroom stops while buying fuel or eating at waterfront restaurants. A portable toilet can be taken onboard, and dumped at a shoreside station or at home. It is illegal to dump any untreated sewage into any inland lake, river, or coastal water inside the 3-mile limit. Fats, solvents, oil, emulsifiers, paints, poisons, phosphates, disposable diapers, and sanitary napkins should be kept out of toilets. In addition, pets should be taken to a marina's posted pet walk area and waste disposed of properly.

If the boat has a Marine Sanitation Device (MSD) type 1 or 2, which pretreats sewage before it is discharged overboard, by law it must be certified by the U.S. Coast Guard. To keep the MSD working properly, follow the manufacturer's suggested maintenance program. Clearly post MSD use instructions near the toilet. If your MSD uses a biodegradable disinfectant, keep the liquid container full. For sanitation systems that require pretreatment chemicals, use chlorine- and formaldehyde-free products. To help prevent clogging, use fast-dissolving marine toilet tissue made for MSD use. When in "no discharge" waters, lock or secure the toilet closed so it cannot discharge overboard.

If your boat has an MSD type 3 with a holding tank, use a pumpout facility at the end of each boating day. They are fast, clean, easy to use, and inexpensive. Consider contracting with a mobile pumpout service to empty your tank while in the slip. If your boat has a y-valve and through hull, always keep them locked closed when inside coastal waters, in bays, in any inland river or lake where dumping untreated sewage is illegal. Opening a y-valve and through-hull is legal only in ocean waters 3 miles or further from shore. The best solution is to remove y-valves and through-hulls so no sewage can go overboard. Use only environmentally compatible holding tank deodorants. To help prevent clogging, use fast dissolving marine toilet tissue made for MSD use.

To find the nearest pumpout service, consult National Oceanic and Atmospheric Administration (NOAA) charts, cruising guides, boating almanacs, or local pumpout maps, or call the National Hotline (Telephone: 1-800-ASK-FISH). When cruising, look for the national pumpout logo at boating facilities to find a pumpout service. If pumping out is self-service, ask a marina staff member for instructions on how to operate the pumpout equipment. Be sure to turn the machine off before leaving and wash your hands after each use.

Encourage the installation of more onshore pumpouts and dump stations by letting marina owners know of the need for local facilities. Report any malfunctioning pumpouts or dump stations by calling the National Hotline (Telephone: 1-800-CLEANUP).

2.4.9.3 Information Resources

- **U.S. Coast Guard, *Marine Sanitation Devices (MSDs)*** (http://www.uscg.mil/hq/gm/mse/msd.htm): This fact sheet provides answers to frequently asked questions about MSDs.
- **USEPA, *Vessel Sewage Discharge Program*** (http://www.epa.gov/owow/oceans/regulatory/vessel_sewage/): This Web site contains regulatory and technical resources on vessel sewage discharge and marine sanitation devices.
- **California Coastal Commission, *Used Oil and Sewage Related Services*** (http://www.coastal.ca.gov/ccbn/ccbndx.html): This Web site provides information on marina-based services by county and mobile environmental services for boaters.
- **San Francisco Estuary Project, *MSDs and Pumpout Stations*** (http://www.abag.ca.gov/bayarea/sfep/programs/boated/msds.html): This fact sheets describes the importance of properly disposing of sewage and tips for following management practices.
- **California Department of Boating and Waterways, *Vessel Pumpout Locations*** (http://dbw.ca.gov/pump24/html/index.htm): This Web site provides the names and phone numbers of marinas with vessel pumpout facilities, which can be sorted by name, city, or region. Regional maps are also available online.
- **California Department of Boating and Waterways, *Shipshape Sanitation*** (http://dbw.ca.gov/Pubs/Sanitation/index.htm): This fact sheet explains the California laws regarding vessel sewage discharge, and the importance of proper disposal.
- **California Department of Boating and Waterways, *Sewage Holding Tank Systems for Recreational Boats*** (http://dbw.ca.gov/pumpinfo/PUMP.HTM): This fact sheet describes California law on sewage holding tanks, and includes information on system design, equipment selection, installation and maintenance.
- **U.S. Coast Guard, *Federal Marine Sanitation Device Regulations*** (http://dbw.ca.gov/Pubs/FedMSD/index.htm): This fact sheet describes federal regulations and includes a list of no discharge areas in California.
- **USEPA, No-Discharge Zone Evaluation** (http://www.epa.gov/owow/oceans/regulatory/vessel_sewage/NDZSurveyFinal0408.pdf): This report presents the final findings of USEPA's study evaluation of the effectiveness of vessel sewage "No Discharge Zones" established by states under Section 312(f)(3) of the CWA. USEPA surveyed boaters and marina around the country to obtain information about pumpout availability, pumpout use, and No Discharge Zone awareness.
- **California Coastal Commission, Boating Clean and Green Campaign, *The California Clean Marina Toolkit*** (http://www.coastal.ca.gov/ccbn/toolkit/marina-toolkit.pdf): The Toolkit includes a section describing some strategies that can help reduce overboard discharges of raw or poorly treated sewage. Also, the Toolkit includes a boater fact sheet including information on what boaters can do to keep boat sewage out of the water.
- **California Stormwater Quality Association, *California Stormwater Best Management Practice Handbook: Industrial and Commercial: Marinas, Boatyards, and Ports*** (http://www.cabmphandbooks.com/Documents/Industrial/MarinasBoatyardsPorts.pdf): The Marinas, Boatyards, and Ports section of the CASQA Industrial and Commercial Handbook covers pollutant sources at these areas and describes management practices for reducing the impacts of common activities, such as boat cleaning, boat maintenance, fueling, and sewage management, among others.

2.4.9.4 Case Study

Oak Harbor Marina Floating Restroom and Barge. Oak Harbor Marina in Washington is a city-owned, recreational boating facility. The marina complies with the marina management measures for sewage facility and maintenance of sewage facilities, as well as a number of other management measures. The facility purchased a floating restroom barge, which has both a pumpout and a dump station, to service the guest docking area. In 1995, a combined total of 1,700 pumpouts were done. An estimated total of 40,000 gallons of boat sewage was collected from the barge and fuel dock, an average of 23.5 gallons per boat. (http://www.p2pays.org/ref/04/03708/text/ch18.html).

2.4.9.5 References

USEPA. 2001. *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating*. EPA 841-B-01-005. U.S. Environmental Protection Agency, Washington, DC. (http://www.epa.gov/owow/nps/mmsp/index.html)

Fact Sheet Links:
- Programs
- Management Practices
- Information Resources
- Case Studies
- References

2.4.10 Management Measure 4.1H Assessment, Siting, and Design Waste Management Facilities

Management Measure

Install facilities where needed for the proper recycling or disposal of solid wastes (such as oil filters, lead acid batteries, used absorbent pads, spent zinc anodes, and fish waste as applicable) and liquid materials (such as fuel, oil, solvents, antifreeze, and paints) generated by users of marinas and boat maintenance areas. Design these facilities to allow ease of access, post signage to promote use by the boating public, and encourage recycling to the fullest extent possible.

2.4.10.1 Programs

The California Integrated Waste Management Board is responsible for managing California's solid waste stream. The Board develops waste reduction programs, provides public education and outreach, assists local governments and businesses, and fosters market development for recyclable materials. You can obtain information on used oil recycling, including the location of local recycling centers, and other waste management topics on the Board's Web site: http://www.ciwmb.ca.gov/.

2.4.10.2 Management Practices

Good housekeeping at marinas is a key practice for keeping waste materials out of the water. The following practices can be used by marina operators to improve and encourage the use of waste disposal facilities:

- Encourage marina patrons to avoid doing any hull maintenance while their boats are in the water. Scraped-off paint and debris can be harmful to aquatic life.
- Place trash and recycling receptacles in convenient locations for marina patrons. Let customers know they are there and encourage their use. In addition, provide information on fishing line collection and recycling or disposal. Provide boaters with trash bags so they can collect waste onboard and bring it back to be disposed of properly.
- Require patrons to clean up pet wastes. Provide a specific dog walking area at the marina. Plastic bags provided near the walking area will help keep the marina clean and help customers comply with the rule.
- Install fish cleaning stations at the marina and at boat launch sites. Cleaning stations help keep waters from becoming dumping grounds. In addition, compost fish waste where appropriate and encourage catch and release fishing, which does not kill the fish and produces no fish waste. Encourage boaters to clean fish offshore where the fish are caught and return the waste to the sea (if allowed by the State).

2.4.10.3 Information Resources

- **California Department of Fish and Game, *Fishing Line Recycling*** (http://www.dfg.ca.gov/fishing/html/Publications/recycle.html): This Web page provides instructions for recycling fishing lines in California.

- **Maryland Clean Marina Initiative, *Waste Containment and Disposal*** (http://dnrweb.dnr.state.md.us/download/cleanmarina/8TipShee-ps.pdf): This fact sheet describes waste management practices for trash, fish waste, and liquid waste.
- **California Coastal Commission, Boating Clean and Green Campaign, *The California Clean Marina Toolkit*** (http://www.coastal.ca.gov/ccbn/toolkit/marina-toolkit.pdf): The Toolkit includes fact sheets marina operators can use to educate boaters about how to properly use and dispose of hazardous wastes, trash and marine debris, sewage and gray water. The Toolkit also provides recommended practices marina operators can implement at their marinas for addressing vessel cleaning and maintenance, oil, fuel and hazardous wastes and trash and marine debris management.
- **California Coastal Commission, *Used Oil and Sewage Related Services*** (http://www.coastal.ca.gov/): This Web site provides information on marina- based services for boaters by county and mobile environmental services.
- **California Integrated Waste Management Board, Household Hazardous Waste Program** (http://www.ciwmb.ca.gov/HHW/): This Web site provides information on the location of certified used oil and household hazardous waste collection centers, a directory of products with recycled content, information on products made from rerefined oil, and grant opportunities for demonstration projects related to used oil and household hazardous waste.
- **Earth911, Clean Boating Information** (http://california.earth911.org/usa/master.asp?s=bwq&a=cleanboating/ index.asp&cluster=1): The California Clean Boating Network (CCBN) and Earth911 designed a Clean Boating Information Web site that provides a database of boating-related recycling and disposal locations in California along with tips and suggestions for clean boating and links to other clean boating programs in California and beyond.

2.4.10.4 References

USEPA. 2001. *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating*. EPA 841-B-01-005. U.S. Environmental Protection Agency, Washington, DC. (http://www.epa.gov/owow/nps/mmsp/index.html)

Fact Sheet Links:
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2.4.11 Management Measure 4.2A Operation and Maintenance Solid Waste Control

Management Measure

Properly dispose of solid wastes produced by the operation, cleaning, maintenance, and repair of boats and operation of marinas—and encourage recycling of recyclable materials to the fullest extent possible—to limit entry of solid wastes to surface waters.

2.4.11.1 Programs

The California Coastal Commission's Boating Clean and Green Program publishes information on oil and sewage-related services (http://www.coastal.ca.gov/ccbn/ccbndx.html).

San Diego BayKeeper works to detect and report illicit discharges and pollution from boating activities with boat patrols, monitoring, and a pollution hotline (http://www.sdbaykeeper.org/).

The Los Angeles County Department of Public Works runs a Storm Water Program that provides Web-based information on used oil, solid waste, storm water runoff, recycling, and hazardous waste (http://www.ladpw.org/epd/).

The California Coastal Commission holds the California Coastal Cleanup Day to help reduce marine debris along the coast, as well as educate the public on the dangers of dumping marine debris and the potential for environmental damage. The Web site provides information on the annual event, as well as on marine debris and its effects (http://www.coastal.ca.gov/publiced/ccd/ccd.html).

The Marin County Storm Water Pollution Prevention Program produces publications and Web-based information about used oil, hazardous waste, recycling, storm water, and other water quality issues (http://www.mcstoppp.org/).

The City of Dana Point, Clean Beaches, Clean Oceans provides a public awareness program on the causes of pollution and solutions. It is expanding a catch basin filter installation and maintenance program, as well as educating owners on runoff, recycling, household waste, and grease prevention in sewers (Telephone: 949-248-3588).

Heal The Bay provides Santa Monica Bay's environmental events calendar, citizen involvement, and beach report (http://www.healthebay.org/).

2.4.11.2 Management Practices

For Marina Owners and Operators

Provide easily accessible recycling facilities for glass, newspapers, aluminum, plastics, batteries, and numerous, well-marked trash receptacles. Recycling can reduce the amount of dumpster trash, which lowers waste hauling fees. Train staff to inform patrons of trash disposal practices and to pick up any

trash they see lying about. Provide boaters with trash bags imprinted with the marina's logo to demonstrate a commitment to pollution prevention.

Encourage staff and boaters to follow these principles for cleaning activities:

- Use less-toxic or less-caustic materials and use less of them.
- Purchase frequently used materials in bulk to minimize waste.
- Buy products that come in reusable containers and have minimal packaging.
- Advise customers to buy only what is needed for immediate use to avoid throwing away what is left over.
- Share leftover products with others who need them.
- Avoid the use or sale of anything described as being "disposable" and encourage the use of long-life products.

For Boaters

Conduct hull work indoors or under cover where possible, and discourage dockside sanding and painting over the water. At the very least, stretch a tarp between the side of the boat and the dock to catch any falling debris. Use drop cloths or filter cloths beneath the hull to collect sanding dust and paint drops. Empty the cloths into a trash container frequently, and do not leave them dirty overnight. Use only non-abrasive underwater hull cleaning techniques to prevent excessive paint discharge. Dry storage reduces the need for antifouling paints and saves money.

Dispose of paints, batteries, antifreeze, cleaning products, oil, oil filters, and other hazardous wastes at a hazardous waste collection facility. Call Earth's 911 to find a location nearby (1-800-CLEAN-UP; Web site: http://earth911.org/). Recycle paints, batteries, oil, oil filters, and antifreeze.

Keep all trash on board. Never throw cigarette butts, fishing line, or any other garbage into the ocean. Take advantage of shoreside facilities to recycle plastic, glass, metal, and paper. Reduce the potential for litter by removing unnecessary packages and wrappings, and bringing reusable containers to the boat. Have several litter bags onboard and discard full ones at the marina dumpster or at home. When trash accidentally falls overboard, go back and get it.

2.4.11.3 Information Resources

- **Florida Department of Environmental Protection, Solid Waste Management** (http://www.dep.state.fl.us/law/Documents/Grants/CMP/pdf/SolidWasteManagementBMP.pdf): This fact sheet, part of the Florida Department of Environmental Protection's *Clean Boatyard Manual*, describes ways to prevent pollution from solid waste.
- **U.S. Coast Guard, *Marine Debris: Garbage Dumping Restrictions in U.S. Waters*** (http://www.uscg.mil/hq/g-m/nmc/mardeb.htm): This fact sheet explains federal regulations on dumping in territorial waters.
- **University of California Cooperative Extension, *Marina Pollution Prevention Manual*** (http://nsgd.gso.uri.edu/cuimr/cuimrh95002.pdf): This manual describes important components of pollution prevention at recreational boating facilities. It covers pollution sources, hazardous waste

management, spill response, marina staff procedures and training, San Diego County agency and service contacts, and publications for distribution among marina staff, contractors, and boaters.

- **California Department of Fish and Game, *Fishing Line Recycling*** (http://www.dfg.ca.gov/fishing/html/Publications/recycle.html): This Web page provides instructions for recycling fishing lines in California.
- **Maryland Clean Marina Initiative, *Waste Containment and Disposal*** (http://dnrweb.dnr.state.md.us/download/cleanmarina/8TipShee-ps.pdf): This fact sheet describes waste management practices for trash, fish waste, and liquid waste.
- **California Coastal Commission, Boating Clean and Green Campaign, *The Boat Maintenance Checklist*** (http://www.coastal.ca.gov/ccbn/checklist.pdf): This checklist assists those conducting boat maintenance and repair in implementing management practices for minimizing the generation of hazardous wastes, discharges of pollutants to inland and coastal waters, and air pollution discharges. The checklist also addresses management practices that include methods for the proper disposal or recycling of hazardous and solid wastes.
- **California Coastal Commission, Boating Clean and Green Campaign, *The California Clean Marina Toolkit*** (http://www.coastal.ca.gov/ccbn/toolkit/marina-toolkit.pdf): The Toolkit includes fact sheets marina operators can use to educate boaters about how to properly use and dispose of hazardous wastes, trash and marine debris, sewage and gray water, and what the simple household alternative to boat cleaning and maintenance are. The Toolkit also provides recommended practices marina operators can implement at their marinas for helping boaters to recycle and properly dispose of trash and marine debris.

2.4.11.4 References

USEPA. 2001. *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating*. EPA 841-B-01-005. U.S. Environmental Protection Agency, Washington, DC. (http://www.epa.gov/owow/nps/mmsp/index.html)

Fact Sheet Links:
➔ Programs
➔ Management Practices
➔ Information Resources
➔ Case Study
➔ References

2.4.12 Management Measure 4.2B Operation and Maintenance Fish Waste Control

Management Measure

Promote sound fish waste management through a combination of fish-cleaning restrictions, public education, and proper disposal of fish waste.

2.4.12.1 Management Practices

Use a fish cleaning station, which usually has a waste grinder, running water, and a large surface to work on. Alternatively, clean fish as they are caught offshore and toss fish waste only in open unrestricted water or at sea (where the State allows it), rather than in the marina basin where circulation and flushing are more limited and the fish waste could create a water quality and odor problem.

Recycle fish parts by composting them with peat moss, or burying them in a garden to be used as fertilizer. Fish parts can also be frozen and re-used as bait or chum on another next fishing trip. When no other option exists, bag the fish parts and place the bag in the trash.

Finally, avoid releasing bait either dead or alive into the water. This can introduce foreign species to fresh water lakes. You might not be releasing just the bait, but something that it is infected with.

2.4.12.2 Information Resources

Maryland Clean Marina Initiative, *Waste Containment and Disposal* (http://dnrweb.dnr.state.md.us/download/cleanmarina/8TipShee-ps.pdf): This fact sheet describes waste management practices for trash, fish waste, and liquid waste.

California Coastal Commission, Boating Clean and Green Campaign, *The California Clean Marina Toolkit* (http://www.coastal.ca.gov/ccbn/toolkit/marina-toolkit.pdf): The Toolkit includes a section on how marina operators can address fish waste, marine debris, hazardous and solid wastes, sewage and gray water at their marinas.

2.4.12.3 Case Study

Marin County–Petaluma River Black Point Boat Launching Facility. In 2003, the Department of Boating and Waterways awarded the County of Marin $80,000 for a proposed $782,000 project to replace the boat launching facility at Black Point in Novato, on the Petaluma River. The new boat launching facility will include a fish cleaning station. Additional measures incorporated into the plan include new restrooms and a boat wash-down area (http://dbw.ca.gov/PressRoom/2003/030313bwc.asp).

2.4.12.4 References

USEPA. 2001. *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating*. EPA 841-B-01-005. U.S. Environmental Protection Agency, Washington, DC. (http://www.epa.gov/owow/nps/mmsp/index.html)

Fact Sheet Links:
- Programs
- Management Practices
- Information Resources
- Case Studies
- References

2.4.13 Management Measure 4.2C Operation and Maintenance Liquid Material Control

Management Measure

Provide and maintain appropriate storage, transfer, containment, and disposal facilities for liquid materials—such as fuel, oil, solvents, antifreeze, and paints—and encourage recycling of these materials to the fullest extent possible.

2.4.13.1 Programs

The Marin County Storm Water Pollution Prevention Program produces publications and Web-based information about used oil, hazardous waste, recycling, storm water, and other water quality issues (http://www.mcstoppp.org/).

The Los Angeles County Department of Public Works runs a Storm Water Program that provides Web-based information on used oil, solid waste, storm water runoff, recycling, and hazardous waste (http://www.ladpw.org/epd/).

The California Department of Fish and Game, Office of Spill Prevention and Response maintains CalTIP, a spill response hotline: (Telephone: 1-888-DFG-CALTIP; Web site: http://www.dfg.ca.gov/Ospr/index.html).

The California Coastal Commission's Boating Clean and Green Program publishes information on oil and sewage-related services (http://www.coastal.ca.gov/ccbn/ccbndx.html).

The California Integrated Waste Management Board's Used Oil Recycling Program develops and promotes alternatives to the illegal disposal of used oil by establishing a statewide network of collection opportunities and undertaking outreach efforts to inform and motivate the public to recycle used oil (http://www.ciwmb.ca.gov/UsedOil/). The Board's Household Hazardous Waste Program aims to provide the public with convenient collection locations for used oil and other types of household hazardous waste, increase the demand for new products made from oil and household hazardous waste, and provide grants to local governments, nonprofit organizations, and for research and demonstration projects (http://www.ciwmb.ca.gov/HHW/).

2.4.13.2 Management Practices

For Marina Owners and Operators

Storage: Store minimal quantities of hazardous materials. Reduce waste by buying only as much as is needed. Liquid materials should be carefully stored under cover and on an impervious surface. Locate storage and disposal areas for liquid materials in or near repair and maintenance areas for ease of access but away from flood areas and fire hazards, and protect them from rain with a cover and berms or secondary containment.

Disposal: Provide clearly labeled, separate containers for the disposal of waste oils, fuels, and other liquid wastes. Keeping them separate minimizes the chance of combining dangerous chemicals and makes them easier to recycle.

Spill prevention: Prepare a hazardous material spill recovery plan and update it as new types of materials are acquired or other changes are necessary. Keep adequate spill response equipment where liquid materials are stored and used. Change engine oil using non-spill vacuum-type systems, and use the same equipment to suction oily water from bilges.

For Boaters

Recycle liquid materials where possible, and ask your marina to provide recycling if it does not already do so. Use antifreeze and coolants that are less toxic to the environment. Propylene-glycol-based antifreeze (with a pink color) is less toxic than the blue-green antifreeze. Recycle the blue-green antifreeze if it is used.

Use alternative, less-toxic liquid materials where practical. Minimize the use of solvents or switch to water-soluble choices. Before discarding paint cans, remove the top and let any paint residue dry and harden.

2.4.13.3 Information Resources

- **Florida Department of Environmental Protection (DEP), Liquid Waste Storage Management** (http://www.dep.state.fl.us/law/Documents/Grants/CMP/pdf/LiquidWasteStorageManagementBMP.pdf): This fact sheet, part of the Florida DEP's *Clean Boatyard Manual*, describes ways to store liquid waste to prevent pollution.
- **University of California Cooperative Extension, *Marina Pollution Prevention Manual*** (http://nsgd.gso.uri.edu/cuimr/cuimrh95002.pdf): This manual describes important components of pollution prevention at recreational boating facilities. It covers pollution sources, hazardous waste management, spill response, marina staff procedures and training, San Diego County agency and service contacts, and publications for distribution among marina staff, contractors, and boaters.
- **California Coastal Commission, Boating Clean and Green Campaign, *The Boat Maintenance Checklist*** (http://www.coastal.ca.gov/ccbn/checklist.pdf): This checklist assists those conducting boat maintenance and repair in implementing management practices for minimizing the generation of hazardous wastes, discharges of pollutants to inland and coastal waters, and air pollution discharges. The checklist also addresses management practices that include methods for the proper disposal or recycling of hazardous and solid wastes.
- **California Coastal Commission, Boating Clean and Green Campaign, *The California Clean Marina Toolkit*** (http://www.coastal.ca.gov/ccbn/toolkit/marina-toolkit.pdf): The Toolkit includes fact sheets marina operators can use to educate boaters about how to properly use and dispose of hazardous wastes, trash and marine debris, sewage and gray water, and what the simple household alternative to boat cleaning and maintenance are. The Toolkit also provides recommended practices marina operators can implement at their marinas to control oily discharges, encourage proper disposal of oily and hazardous wastes and prevent fuel spills.
- **California Coastal Commission, Boating Clean and Green Program, *Used Oil and Sewage Related Services*** (http://www.coastal.ca.gov/ccbn/usedoilnew.html): This Web site provides a directory of marina-based services by county, a link to Earth911's directory of boating

environmental services that can be searched by zip code, a directory of mobile environmental services for boaters in California, and the California Integrated Waste Management Board's list of certified used oil collection centers.

- **California Integrated Waste Management Board, Household Hazardous Waste Program** (http://www.ciwmb.ca.gov/HHW/): This Web site provides information on the location of certified used oil and household hazardous waste collection centers, a directory of products with recycled content, information on products made from rerefined oil, and grant opportunities for demonstration projects related to used oil and household hazardous waste.

- **Earth911, Clean Boating Information** (http://www.earth911.org/usa/master.asp?s=bwq&a=cleanboating/index.asp): The California Clean Boating Network (CCBN) and Earth911 designed a Clean Boating Information Web site that provides a database of boating-related recycling and disposal locations in California along with tips and suggestions for clean boating and links to other clean boating programs in California and beyond.

2.4.13.4 References

USEPA. 2001. *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating*. EPA 841-B-01-005. U.S. Environmental Protection Agency, Washington, DC. (http://www.epa.gov/owow/nps/mmsp/index.html)

Fact Sheet Links:
- Programs
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- Information Resources
- Case Study
- References

2.4.14 Management Measure 4.2D Operation and Maintenance Petroleum Control

Management Measure

Reduce the amount of fuel and oil from boat bilges and fuel tank air vents entering marina and surface waters.

2.4.14.1 Programs

The Los Angeles County Department of Public Works runs a Storm Water Program that provides Web-based information on used oil, solid waste, storm water runoff, recycling, and hazardous waste (http://www.ladpw.org/epd/).

The Santa Monica BayKeeper Program in LA County is conducting a "Fill It, Don't Spill It" campaign to address the accidental discharge of petroleum at fuel docks (http://www.smbaykeeper.org/index.php?func=programs).

The Marin County Storm Water Pollution Prevention Program produces publications and Web-based information about used oil, hazardous waste, recycling, storm water, and other water quality issues (http://www.mcstoppp.org/).

The California Department of Fish and Game, Office of Spill Prevention and Response maintains the CalTIP hotline (Telephone: 1-888-DFG-CALTIP; Web site: http://www.dfg.ca.gov/Ospr/index.html).

The Lake Tahoe Pollution Prevention Marina Program is focused on promoting environmentally responsible and cost-effective management of used oil. The emphasis is on increasing boater awareness of the impacts of illegally disposed oil, poorly maintained watercraft, bilge water pumped overboard, and on the availability of used oil collection centers (http://www.co.el-dorado.ca.us/emd/solidwaste/marina.html).

The California Coastal Commission's Boating Clean and Green Campaign administers the Shop Clean and Green Program. Shopping Clean and Green Displays, designed for marina supply shops, provide consumers with free plastic wallet-sized information cards. These cards contain product information and tips for recycling used oil and reducing oil and fuel discharges from boats as well as toll-free numbers for boater information about waste disposal and reporting spills (http://www.coastal.ca.gov/ccbn/ccbndx.html).

The California Coastal Commission's Boating Clean and Green Program publishes information on oil and sewage-related services (http://www.coastal.ca.gov/ccbn/ccbndx.html).

The Boating Clean and Green Campaign Dockwalkers Program trains boaters and other volunteers to conduct face-to-face boater education on environmentally sound boating practices (http://www.coastal.ca.gov/ccbn/ccbndx.html).

The Pacific Oil Spill Prevention Education Team (POSPET) is a forum for information exchange among various stakeholder groups in British Columbia, Washington, Oregon, and California pertaining to oil spills. POSPET has developed a Spills Aren't Slick campaign and has also been instrumental in promoting the innovative 1-800-OILS-911 spill reporting number in the Pacific states and British Columbia. This easy-to-remember number allows a boater reporting an oil spill to be automatically routed to the correct emergency response call center in any of those jurisdictions. The Pacific States/BC Oil Spill Task Force provides staff support for POSPET and maintains the spill reporting number (http://www.oilspilltaskforce.org/pospet.htm).

2.4.14.2 Management Practices

To prevent fuel and oil leaks, keep your engine well tuned. Place an oil absorbent pad or pillow under your engine where drips may occur and in the bilge. Check the pads often and dispose of them as hazardous waste at a marina or nearby collection center. Spill-proof your oil changes by using an oil change pump to transfer oil to a spill-proof container. Wrap a plastic bag or absorbent pad around the oil filter to prevent oil from spilling into the bilge. Fill fuel tanks slowly and carefully and use absorbent pads or rags to catch drips and spills. Do not top off or overflow the fuel tank, and leave it 5 percent empty to allow fuel to expand as it warms. If there is a spill, do not use soap or emulsifiers to disperse it. That is harmful to the environment, as well as illegal. Rather, notify the marina and the proper authorities.

If the boat has an outboard motor, fill tanks carefully to avoid spilling fuel into the boat and wasting fuel. Mix oil in the fuel according to manufacturer recommendations. Clean any drops off the deck by wiping with an oil absorption pad. Close portable tank fuel vents when the boat is not in use to save fuel from vapor loss, and store fuel only in approved marine containers.

If the boat has a built-in fuel tank on board, install a fuel/air separator in the air vent line from the tank to prevent vent spills. Routinely check for and fix fuel leaks. Use a drip pan under the engine. Use a bilge-oil absorbent pillow and dispose of it before it is fully saturated by recycling it with used oil, or use a bilge-maintenance bioremediation pad with natural oil-eating bacteria, which can last much longer than absorbent pads. If the boat is 26 feet or more in length, it is a legal requirement to display a U.S. Coast Guard oil discharge placard on the boat.

All boaters should avoid pumping any bilge water that is oily or has a sheen. A drip pan should be used under the engine and routine checks performed for oil or fuel leaks. In addition, avoid the use of bilge cleaners that are detergents or emulsifiers. These chemicals dissolve the oil and fuel in the water so both can be pumped overboard into the water. The bilge may be clean, but the water won't be.

If there is a spill, immediately stop the source, notify the marina for assistance, and call the U.S. Coast Guard (Telephone: 1-800-424-8802). Contain the spill with absorbent pads or booms, and do not apply any detergent or emulsifier to the oil slick. Dispose of absorbent pads with recyclable oil, or wrap them in newspaper and tie them inside a plastic bag for disposal with your home trash.

2.4.14.3 Information Resources

- **Rhode Island Sea Grant, Bilges, Fueling and Spill Response** (http://seagrant.gso.uri.edu/factsheets/boaterfs/bilge.html): This is a brief fact sheet with information on bilge pumping, fueling, and spill response.
- **El Dorado County, Lake Tahoe Pollution Prevention Marina Program** (http://www.co.el-dorado.ca.us/emd/solidwaste/marina.html): This Web site provides information about a Lake Tahoe program to reduce oil pollution.

- **California Coastal Commission, Used Oil and Sewage Related Services** (http://www.coastal.ca.gov/ccbn/ccbndx.html): This Web site provides information on marina-based services by county, mobile environmental services for boaters, and used oil collection centers in California.
- **El Dorado Environmental Management Department, Oil Absorbent Pads and Pillow Disposal Sites** (http://www.co.el-dorado.ca.us/emd/solidwaste/pillow_sites.html): This is a list of marinas participating in Lake Tahoe's Pollution Prevention Marina Program by collecting absorbent pads and pillows.
- **Florida Department of Environmental Protection (DEP), Used Oil and Petroleum Management** (http://www.dep.state.fl.us/law/Documents/Grants/CMP/pdf/PetroleumBMP.pdf): This 14-page fact sheet, part of the Florida DEP's *Clean Boatyard Manual*, provides guidance for marina owners on proper storage, disposal, spill prevention, and fueling procedures.
- **California Coastal Commission, *Oil Pollution Solutions for Boaters: Designing and Implementing Programs to Reduce Hydrocarbon Discharges***. This is a manual for government, businesses and individual owners that provides guidance on reducing oil pollution and developing education and outreach programs. It presents an overview of marine pollution and boating in California, information on services marina operators can provide to reduce pollution, guidance on various types of boats and their operation/maintenance needs, and information on the development of outreach programs. Order from the Boating Clean and Green Campaign (Telephone: 415-904-5200).
- **University of California Cooperative Extension, *Marina Pollution Prevention Manual*** (http://nsgd.gso.uri.edu/cuimr/cuimrh95002.pdf): This manual describes important components of pollution prevention at recreational boating facilities. It covers pollution sources, hazardous waste management, spill response, marina staff procedures and training, San Diego County agency and service contacts, and publications for distribution among marina staff, contractors, and boaters.
- **California Department of Fish and Game, Office of Spill Prevention and Response (OSPR), *The Office of Spill Prevention and Response's Guide to Clean, Green Boating***. This is a 4-inch by 6-inch flip guide to oil spill prevention. It includes information about OSPR, the impacts of oil spills, and pollution prevention tips. It also includes rules of the road, navigation tips, information about boating courses, and a space to write notes. Contact California Boating Clean and Green Campaign (Telephone: 415-904-5200).
- **California Coastal Commission, Boating Clean and Green Campaign - *the California Clean Marina Toolkit*** (http://www.coastal.ca.gov/ccbn/toolkit/marina-toolkit.pdf): The Toolkit includes fact sheets marina operators can use to educate boaters about how to prevent oil and fuel spills. The Toolkit also provides suggested management strategies marina operators can implement to reduce or prevent pollution problems at their marinas. Some of the suggested practices consist of providing staff training and preparing for emergency response.
- **California Coastal Commission, Boating Clean and Green Campaign, "*Fill It, Don't Spill it*" Fuel Dock Signs** (http://www.coastal.ca.gov/ccbn/Fuelsign.jpg): The signs include management practices to reduce fuel spills and provide the State and Federal phone numbers to report oil and chemical spills as well as the 1-800-CLEANUP number to locate the nearest environmental services (used oil collection, sewage and bilge pumpouts, and absorbent pad distribution and collection facilities) for boaters by zip code.
- **BoatU.S. Foundation, "Spill? What Spill? Products that keep fuel where it belongs—in your tank"** (http://www.boatus.com/foundation/findings/findings40/FoundationFindings40.pdf): This article in PDF format describes and reviews 10 fuel spill prevention devices for boaters, including

inline fuel-air separators, deck fill-vent combinations (also known as vented fills), and electronic fuel management systems (also known as fuel computers or flow meters).

- **Earth911, *Clean Boating Information*** (http://www.earth911.org/usa/master.asp?s=bwq&a=cleanboating/index.asp): The California Clean Boating Network (CCBN) and Earth911 designed a Clean Boating Information Web site that provides a database of boating-related recycling and disposal locations in California along with tips and suggestions for clean boating and links to other clean boating programs in California and beyond.

2.4.14.4 Case Study

Lake Tahoe Pollution Prevention Marina Program. The Lake Tahoe Pollution Prevention Marina Program was motivated by a general concern for the ecosystem health in the lake. It promotes responsible management of used oil and increased public and boater awareness. The program focuses on lake ecosystems, the environmental impacts of oil pollution, boater education, and improving the availability of oil collection centers (http://www.co.el-dorado.ca.us/emd/solidwaste/marina.html).

Fact Sheet Links:

- Programs
- Management Practices
- Information Resources
- Case Studies
- References

2.4.15 Management Measure 4.2E Operation and Maintenance Boat Cleaning and Maintenance

Management Measure

For boats that are in the water, perform (1) topside cleaning and maintenance operations to minimize, to the extent practicable, the release to surface waters of (a) harmful products such as cleaners and solvents and (b) paint; and (2) underwater hull cleaning and maintenance operations to minimize, to the extent practicable, the release of paint and anodes.

2.4.15.1 Programs

The Nontoxic Bottom Paint Demonstration Project by the University of California, Davis, Sea Grant Extension Program in San Diego County provides educational resources and conducts field demonstrations of nontoxic boat bottom paints (http://commserv.ucdavis.edu/cesandiego/seagrant/nontoxicdemo.htm).

2.4.15.2 Management Practices

Boat Cleaning

One way to reduce the potential for pollution is to buy "nontoxic" and "phosphate-free" products. While "biodegradable" products are desirable, they are not necessarily nontoxic. If possible, avoid those that warn "do not get in the eyes" or "always wear gloves," such bleach, ammonia, lye, or petroleum distillates.

Buy only as much cleaner as you need to avoid having to dispose of leftover cleaning supplies. If you do have leftovers, give them to another boater or start an exchange program at the marina for cleaners, paints, varnishes, and other materials. Always keep caps on bottles while cleaning to prevent spills.

Wash decks and hulls frequently with fresh water, because this will reduce the need for cleaning products. When cleaners are necessary, use them sparingly. While washing, try to avoid washing dirt, paint chips, and solvents into the water by washing boat hulls above the waterline by hand. Clean boat bottoms ashore, over hard surfaces or over a tarp to contain debris. Whenever feasible, remove boats from the water and clean them where debris can be collected and disposed of in the trash.

Finally, thoroughly wash off your boat if taking it from one body of water to another. This will help minimize the spread of exotic and invasive species.

Boat Maintenance

Whenever possible, hull work should be done inside or under cover where rain cannot wash dust, dirt, paint chips, oil, and solvents into the water.

Prevent pollution from engine maintenance by tuning your engine regularly per the manufacturer's recommendation. This helps your engine operate cleanly and more efficiently. Frequently inspect fuel lines for leaks or potential leaks such as cracks and loose connections, and repair them immediately. Frequently wipe the engine to keep it clean. Engine parts should be cleaned on land over a leak-free container, not over the water, with minimal amounts of engine-cleaning solvents.

Change oil and transmission fluid with a spill-proof pump or vacuum tank. Slip a plastic bag over the oil filter before removing it. Wipe up oil drops immediately with an absorbent pad. Keep used oil separate from other wastes and recycle it. Use antifreeze and coolants that are less toxic to the environment. Propylene-glycol-based antifreeze (with a pink color) is less toxic than the blue-green antifreeze. Recycle the blue-green antifreeze if it is used.

Prevent pollution from sanding and painting by doing all hull scraping, sanding, and chemical stripping onshore over a drop cloth to catch all debris. Prepare the surface with dustless sanders to keep you, the air, the ground, and other boats clean. Be sure to use only legal bottom paints, and depending on boat use, consider a hard non-ablative paint that might last longer. If possible, switch to long-lasting and low-toxicity or nontoxic antifouling paints. New environmentally friendly alternative paints are being developed, so ask around for the latest and best. Leave paint cans open to thoroughly dry out before throwing them away.

2.4.15.3 Information Resources

- **California Coastal Commission, *Clean Green Boat Maintenance*** (http://www.coastal.ca.gov/ccbn/checklist.pdf): This is a pollution prevention boat maintenance checklist for contractors and the general public.
- **University of California Cooperative Extension, *Selecting Underwater and Topside Maintenance Services for Your Boat*** (http://commserv.ucdavis.edu/cesandiego/seagrant/topside.htm): This fact sheet provides guidance on the selection of a professional maintenance service that will follow environmentally sound procedures.
- **University of California Cooperative Extension, *Underwater Hull Cleaner's Best Management Practices*** (http://commserv.ucdavis.edu/cesandiego/seagrant/hullclean.htm): This fact sheet is for professionals and describes ways to lower costs as well as to help the environment with management practices that reduce pollution and extend the life of hull paints.
- **University of California Cooperative Extension, *Selecting a Hull Paint for Your Boat*** (http://commserv.ucdavis.edu/cesandiego/seagrant/selpaint.htm): This fact provides tips on the most environmentally sound practices related to antifouling.
- **Florida Department of Environmental Protection (DEP), Boat Cleaning** (http://www.dep.state.fl.us/law/Documents/Grants/CMP/pdf/BoatCleaningBMP.pdf): This 8-page fact sheet, part of the Florida DEP's *Clean Boatyard Manual*, describes management practices for cleaning in the water, saltwater rinsing, and pressure cleaning.
- **California Department of Boating and Waterways, *Boater Alert: Hydrilla*** (http://dbw.ca.gov/Pubs/Hydrilla/Hydrilla.pdf): This fact sheet provides background information on hydrilla, an invasive species, and gives tips on how to avoid spreading this aquatic pest from one waterway to another.
- **California Coastal Commission, Boating Clean and Green Campaign, *The California Clean Marina Toolkit*** (http://www.coastal.ca.gov/ccbn/toolkit/marina-toolkit.pdf): The Toolkit includes

fact sheets marina operators can use to educate boaters about how to prevent discharge of toxic boat maintenance products and what the alternatives for less toxic products are. The Toolkit also provides suggested practices marina operators can implement to reduce the impact of in-water vessel cleaning and maintenance practices in marina waters.

- **California Coastal Commission, Boating Clean and Green Campaign, *The Boat Maintenance Checklist*.** (http://www.coastal.ca.gov/ccbn/checklist.pdf) This Checklist assists those conducting boat maintenance and repair or contractors in implementing management practices for minimizing the generation of hazardous wastes, discharges of pollutants to inland and coastal waters, and air pollution discharges. The checklist also addresses management practices that include methods for the proper disposal or recycling of hazardous and solid wastes.
- **California Department of Pesticide Regulation and Surface Water Protection Program** (http://www.cdpr.ca.gov/docs/sw/caps.htm): This Web site contains documents produced by the Department of Pesticide Regulation's Copper Antifouling Paint Sub-Workgroup to assess the degree and geographical distribution of copper pollution in California aquatic environments. Documents include meeting agendas and notes, a report on copper sources in urban runoff and shoreline activities, copper monitoring studies in California with potential relevance to the evaluation of copper antifouling paint pollution studies, a summary of a workshop on alternative anti-fouling bottom paints, a bibliography of aquatic copper and antifouling paint studies, monitoring programs and marina sampling data, and several scientific studies and a presentation pertaining to effects of copper on marine ecosystems.
- **California Stormwater Quality Association, *California Stormwater Best Management Practice Handbook: Industrial and Commercial: Marinas, Boatyards, and Ports*** (http://www.cabmphandbooks.com/Documents/Industrial/MarinasBoatyardsPorts.pdf): The Marinas, Boatyards, and Ports section of the CASQA Industrial and Commercial Handbook covers pollutant sources at these areas and describes management practices for reducing the impacts of common activities, such as boat cleaning, boat maintenance, fueling, and sewage management, among others.
- **California Professional Divers Association (CPDA) Web site** (http://www.prodivers.org): The CPDA has certified more than 200 diving hull cleaners statewide in management practices and, through voluntary strategic partnerships, maintains active nonpoint source management practice-certified divers in Regions 2, 3, 4 and 9. For example, in RWQCB 4 the Santa Monica Bay Restoration Commission worked in partnership with the CPDA to fund a class in that region. The CPDA develops the content and instruction format for the NPS/Diving Hull Cleaners BMP Certification Course and continues to conduct research to update to the course information and content. More information about the certification program can be found at the California Professional Divers Association Web site at http://www.prodivers.org/bmpprogram.htm. A list of certified divers can be found at http://www.prodivers.org/bmpdivers.htm.

2.4.15.4 Case Studies

Innovative Boat Maintenance Facility. Summerfield Boat Works, Inc., in Broward County, Florida, installed a water recycling system for boat maintenance activities that does not discharge any wastewater. Water used for cleaning is cleaned with ultraviolet technology and reused. The marina reports conservation of 24,000 gallons of water every year (http://www.umich.edu/~nppcpub/resources/compendia/CSTLpdfs/CSTLmarina.pdf).

Time for a Change: Alternatives to Copper-Based Boat Bottom Paint. The University of California Sea Grant Extension Program has been testing the use of non-toxic boat bottom paints as an alternative to copper-based paints. Through a demonstration project, the Sea Grant Program has shown that new non-toxic paints are a feasible way to mitigate some aquatic pollution. The Sea Grant Program has compiled a short video to illustrate the costs and benefits of alternative boat bottom paints (http://seagrant.ucdavis.edu/boatbottomlink.htm). The economic issues associated with alternative boat bottom paints are also discussed in *Making Dollars and Sense of Nontoxic Antifouling Strategies for Boats* (http://www.csgc.ucsd.edu/PUBLICATIONS/announce052.html).

2.4.15.5 References

USEPA. 2001. *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating*. EPA 841-B-01-005. U.S. Environmental Protection Agency, Washington, DC. (http://www.epa.gov/owow/nps/mmsp/index.html)

Fact Sheet Links:
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2.4.16 Management Measure 4.2F Operation and Maintenance Maintenance of Sewage Facilities

Management Measure

Ensure that sewage pumpout facilities are maintained in operational condition and encourage their use.

2.4.16.1 Programs

The Clean Vessel Act of 1992, Pumpout Grant Program, established by Congress, is administered by the California Department of Boating and Waterways. Clean Vessel Act grant funds are available for the public and private sectors. Grant recipients receive reimbursement for up to 75 percent of the cost of installing or renovating equipment for sewage pumpout facilities (http://dbw.ca.gov/pumpout.asp).

2.4.16.2 Management Practices

Regularly inspect and maintain sewage facilities. Small leaks can cause big pollution problems, and non-functioning facilities increase the chance that boaters will discharge into the water. Consider having a contractor regularly repair and maintain the pumpout and dump station if it takes up too much staff time.

Disinfect the suction connection of a pumpout station (stationary or portable) by dipping or spraying it with disinfectant after each use. This practice is primarily for the protection of public health. Ensure that the disinfectant is safely stored such that it is not at risk of being spilled into the water.

Provide dump stations for boaters who use portable toilets to dispose of their waste.

Keep restroom facilities in the marina clean, dry, and pleasant, and locate them where they are convenient to use.

2.4.16.3 References

USEPA. 2001. *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating*. EPA 841-B-01-005. U.S. Environmental Protection Agency, Washington, DC. (http://www.epa.gov/owow/nps/mmsp/index.html)

Fact Sheet Links:
- ➔ Programs
- ➔ Management Practices
- ➔ Information Resources
- ➔ Case Studies
- ➔ References

2.4.17 Management Measure 4.2G Operation and Maintenance Boat Operation

Management Measure

Restrict boating activities where necessary to decrease turbidity and physical destruction of shallow-water habitat.

2.4.17.1 Management Practices

For Marina Owners and Operators

Restrict boater traffic in shallow-water areas. Put signs up near sensitive areas of your marina or give boaters maps that indicate where boats should be operated with caution to avoid environmental harm.

Mark seagrass beds and other sensitive areas with signs. Survey these areas annually (since they can grow and expand) to ensure you have them marked correctly.

For Boaters

Respect no-wake zones and speed limits. They are posted to protect the environment and other boaters.

Familiarize yourself with the underwater environment where you will be boating so you can anticipate and avoid sensitive environmental areas, like seagrass beds and coral reefs. Ask the marina or a local conservation organization for maps that show these areas.

Ask marina operators and local authorities to post signs in the water that indicate where boaters should not go to avoid damaging the environment.

To prevent the spread of aquatic nuisance species, after leaving the water, inspect your boat and boat accessories and dispose of any plants or animals you find by placing them in a garbage bin.

2.4.17.2 Information Resources:

- **Western Regional Panel**, ***Threats to the West*** (http://answest.fws.gov/): This brochure includes information on how aquatic non-native species are affecting western North America and what is being done to prevent further invasions. It includes drawings and maps showing the worst invasive aquatic plants and animals and their distribution.
- **San Francisco Estuary Institute, *Guide to the Exotic Species of San Francisco Bay*** (http://www.exoticsguide.org): Of growing concern is the spread of invasive species that attach to recreational boat hulls. This guide is intended to help familiarize readers with the exotic marine species found in the San Francisco Bay area. Images of the exotic species can be found in the species gallery along with information such as the scientific and common names of the species,

species description, and how the species was introduced to and distributed throughout the San Francisco Bay area.

- **Aquatic Nuisance Species (ANS) Task Force *Stop Aquatic Hitchhikers: Protect Your Waters* Web site** (http://www.protectyourwaters.net/): This Web site addresses ways to help stop aquatic nuisance species from spreading during recreational water use. The site includes information on common nuisance species, procedures to prevent their spread, and reasons why it is important to take precautions to prevent their spread. Additionally, the site includes information on ways to become involved with links to campaign material, as well as current news releases.

2.4.17.3 References

USEPA. 2001. *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating*. EPA 841-B-01-005. U.S. Environmental Protection Agency, Washington, DC. (http://www.epa.gov/owow/nps/mmsp/index.html)

Fact Sheet Links:
- Programs
- Management Practices
- Information Resources
- Case Study
- References

2.4.18 Management Measure 4.3A Education/Outreach Public Education/Outreach

Management Measure

Implement educational programs to provide greater understanding of watersheds, and to raise awareness and increase the use of applicable marina and boating management measures and practices where needed to control and prevent adverse impacts on ground and surface waters. Public education, outreach, and training programs should involve applicable user groups and the community (e.g., boaters, boating groups, marina owners and operators, boat maintenance facility operators, waterfront agencies, service providers, live-aboards, environmental groups, and other related groups).

2.4.18.1 Programs

The Save Our Shores Sanctuary Steward Certification Program is a training program for presenting beach cleanup and sanctuary slide programs on the Monterey Bay National Marine Sanctuary (http://www.mbnms.nos.noaa.gov/educate/sospgm.html).

The Santa Clara Valley Urban Runoff Pollution Prevention Program has a hotline for callers to obtain information about urban runoff issues (Telephone: 1-800-794-2482; Web site: http://www.scvurppp-w2k.com/default.htm).

The San Francisco Estuary Project's Boater Education Program publishes fact sheets, flyers, and guidance documents on clean boating practices (http://www.abag.ca.gov/bayarea/sfep/programs/boated/).

The California Coastal Commission's Boating Clean and Green Campaign is a statewide education and outreach program that promotes environmentally sound boating practices to marine business and boaters in California. The Campaign has been funded since its inception, in 1997, by the CIWMB used oil program. As of 2004, the Campaign is partnering with the California Department of Boating and Waterways and Contra Costa County Public Works Department Clean Water Program, which are also funding the Campaign. The Boating Clean and Green Campaign was awarded with the 2004 Excellence Program Award given by CalEPA's Household Hazardous Waste/Used Oil Program conducted by CIWMB. The Boating Clean and Green Campaign Dockwalkers Program trains boaters and other volunteers to conduct face-to-face boater education on environmentally sound boating practices (http://www.coastal.ca.gov/ccbn/ccbndx.html).

The Santa Monica Bay Restoration Program's Boater Education Program works to reduce pollution from recreational boating activities through technical assistance and outreach efforts. The program was awarded California Environmental Protection Agency's Program Excellence Award in May 2001 (http://www.santamonicabay.org/site/programs/layout/boater.jsp).

The Keep Our Waters Clean Campaign is an outreach program for increasing awareness of locations and promoting the use of pumpouts and restrooms near Folsom Lake, the Lower American River, and the Sacramento River in the vicinity of Sacramento. The program is supported by the City of Sacramento and other local water utilities and Sacramento County and State parks departments. For more information, contact Elissa Callman at ecallman@cityofsacramento.org.

The Contra Costa County Clean Water Program, California Coastal Commission, and California Department of Boating and Waterways developed the "Keep the Delta Clean. You Play in It. You Drink it Too!" Program, which distributes educational materials and helps marinas develop pollution prevention policies and infrastructure to preserve and protect drinking water quality, recreational activities, and environmental health in the Delta. The Program focuses on the cumulative impacts of pathogens (overboard sewage discharge such as black water and pet waste), petroleum hydrocarbons (containing fuel, oil, contaminated bilge water, and solvents), and other liquid wastes (such as from engine and hull maintenance and general marina activities) generated during recreational boating and marina activities (http://www.coastal.ca.gov/ccbn/keep_the_delta_clean.html).

2.4.18.2 Management Practices

Communicate with Boaters

Ensure that management practices are clearly communicated to boaters. Use signs to inform marina patrons of appropriate clean boating practices and establish bulletin boards for environmental messages and forums for sharing leftover paints and varnishes. Hand out pamphlets or flyers, send newsletters, and add inserts to bill mailings with information about how recreational boaters can protect the environment and keep marina waters clean. Organize environmental education meetings, presentations, and demonstrations. For instance, hold clinics on safe fueling and bilge maintenance. Paint signs on storm drains so patrons know that what they toss on the ground is tossed into the water. Place signs in the water and label charts to alert boaters about sensitive habitat areas they should avoid. Finally, insert language into facility contracts that promotes the use of clean boating and maintenance practices. Using a contract increases the likelihood that tenants will comply with the marina's management practices.

Training and Education of Marina Staff

Educate and train marina staff to do their jobs in an environmentally conscious manner and to be good role models for marina patrons. Have a clearly written environmental management practices agreement for outside contractors to sign as a precondition to their working on any boat in the marina.

Promote recycling and trash reduction programs. Tell your patrons what they can recycle and where to put recyclables. Provide information on local waste collection and recycling programs.

Provide Pollution Prevention Resources

MARPOL is the protocol resulting from the International Convention for the Prevention of Pollution from Ships, initially adopted in 1973 and revised in 1978 (for more information, visit http://www.londonconvention.org/marpol_73.htm). One of the provisions of the MARPOL protocol requires that boats carrying oil, noxious liquids, and harmful substances in packaged form display pollution prevention placards. These placards should be provided and phosphate-free, nontoxic cleaners and other environmentally friendly products stocked in the marina store.

2.4.18.3 Information Resources

- **Marin County Storm Water Pollution Prevention Program, *Boating Clean and Green*** (http://www.mcstoppp.org/consumers.htm): This is Marin County's guide to environmentally sound boating practices, available by calling the county (Telephone: 415-499-6528).

- **Boating Clean and Green Campaign, *An Annotated Catalog of Marina and Recreational Boater Pollution Education Materials*** (http://www.coastal.ca.gov/ccbn/catalognew.html): This is a comprehensive annotated bibliography, available online. It includes audiovisual materials, handbooks and manuals, fact sheets, brochures, posters, stickers, and mailers.
- **Boating Clean and Green Campaign, *Materials for Educators*** (http://www.coastal.ca.gov/ccbn/ccbndx.html): A compilation of fact sheets, reports, signs, and brochures for use by anyone conducting an outreach or education effort.
- **Boating Clean and Green Campaign, *The Dockwalkers Handbook: A Manual for Participants in Dockwalkers' Training***. This manual is used as training for the Dockwalkers program. It addresses pollutants and management practices related to oil and fuel, sewage, boat cleaning and maintenance, hazardous and solid waste, marine debris, and gray water. Contact the California Coastal Commission, Boating Clean and Green Campaign (Telephone: 415-904-5200).
- **Maryland Clean Marina Initiative, *Clean Boating Lesson Plan*** (http://dnrweb.dnr.state.md.us/download/lessonplan6.pdf): This lesson plan includes a speaking plan, overheads, and handouts on petroleum control, vessel sewage, waste containment and disposal, and vessel cleaning and maintenance.
- **California Clean Boating Network, *Changing Tide Newsletter*** (http://www.santamonicabay.org/site/library/layout/index.jsp): The newsletter provides information on clean boating practices in California, focusing on new trends in clean boating practices and environmental services for boaters.
- **University of Wisconsin Cooperative State Research, Education, and Extension Service, Best Education Practices Project** (http://wateroutreach.uwex.edu/beps/index.cfm): The University of Wisconsin Cooperative State Research, Education, and Extension Service has initiated the Water Outreach Education project, also known as the Best Education Practices project, to help natural resource management and outreach professionals to choose appropriate education techniques and resources for their water management programs. The Best Education Practices project will work in collaboration with the federal agency clean and safe water partnership and other networks to develop and promote best education practices for water education and to improve access to education resources and strategies. Project activities reflect advice provided by federal agency clean and safe water partners and a national network of water education organizations created and supported by the work of several national organizations over the last decade. Projects have included a 2002 Study of Provider Needs, Model Education Technique, a literature search, Best Education Practices Pilot Web site, and other reference materials related to water outreach education.
- **California Coastal Commission, Boating Clean and Green Campaign, *The California Clean Marina Toolkit*** (http://www.coastal.ca.gov/ccbn/toolkit/marina-toolkit.pdf): This Toolkit is designed to help marina operators manage and operate their facility as a "clean marina." The Toolkit includes several components designed to assist marina operators in identifying clean marina practices and resources that will help them to implement those practices. The Toolkit has four sections: The first section, *The California Clean Marina Guidebook*, provides recommended practices for addressing particular pollution problems. The second section, *Educating Boaters at Your Marina*, is designed to assist marina operators in educating their customers to be partners in the clean marina effort. The third section, *Environmental Strategies: Case Studies*, examines a series of diverse marinas in California and what they have done to operate as clean marinas. The last section, *Information and Resources*, identifies sources for additional information on topics addressed in the Guidebook.

- **BoatU.S. Foundation, *Boater's Toolbox*** (http://www.boatus.com/foundation/toolbox/): This Web site provides information about boating safety and includes safe and clean fueling tips, information on marine sanitation devices, and litter prevention laws and requirements.

2.4.18.4 Case Study

Southern California Boater's Guide. The Santa Monica Bay Restoration Project published the *Southern California Boater's Guide* as an educational product for the boating community. It serves as a recreational cruising guide and contains important information on clean boating practices. The guide covers Santa Barbara, Ventura, Los Angeles, Orange, and San Diego County harbors. It promotes clean boating in a fun, attractive, and user-friendly format; focuses on the importance of maintaining a boat in the most environmentally friendly manner possible; and explains the potentially adverse impacts that a poorly maintained boat can have on coastal waters.

The guide has three primary sections: General Boating, Harbors, and Boating Clean and Green. The General Boating section addresses boating safety, communications, navigation, rules and regulations, and vessel equipment requirements, registration, and operation. The Harbors section provides information about each of the region's 15 harbors, including overviews; what to do upon arrival; maps; the locations of waste disposal facilities for used motor oil, sewage, hazardous waste, and trash; and finally, a host of recreational opportunities (e.g., boardwalks, restaurants, shopping districts, fun-zones, beach rentals). The Boating Clean and Green section discusses the types of boating-related activities that could pollute marina and coastal waters, and how to prevent such pollution. Contact Stephanie McDonald of the Santa Monica Bay Restoration Project (Telephone: 323-266-7667; E-mail: smbrp@earthlink.net; Web site: http://www.santamonicabay.org/site/library/layout/index.jsp).

2.4.18.5 References

USEPA. 2001. *National Management Measures Guidance to Control Nonpoint Source Pollution from Marinas and Recreational Boating*. EPA 841-B-01-005. U.S. Environmental Protection Agency, Washington, DC. (http://www.epa.gov/owow/nps/mmsp/index.html)